PAPER TRADE JOURNAL

Stock Preparation Equipment . . . p. 14

April 24, 1953

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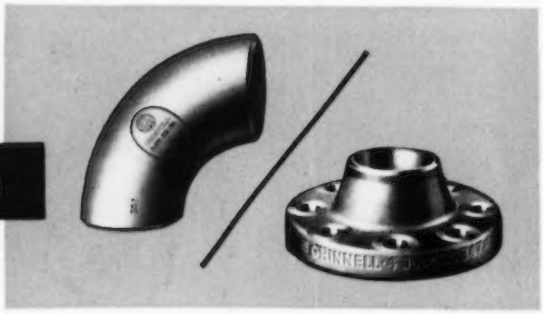

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To help combat mounting costs in the installation and maintenance of piping systems where corrosive or certain other service conditions are involved, Grinnell offers a comprehensive range of welding fittings and flanges in stainless steel.

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Grinnell welding fittings and flanges are available in types 304, 347 and 316. These are in the chromium-nickel grades known as "18-8". The corrosion resistant properties of stainless steels are primarily due to the chromium content which ranges from 17% to 20%. The addition of nickel in ranges from 7% to 14% improves the corrosion resistance as well as the properties at elevated temperatures. A molybdenum addition of 2% to 3%, as found in type 316, increases the resistance to sulphurous and phosphoric acids, brine and hypochlorite solutions, and improves the general resistance to other corrosive liquids, as well as improving the physical properties at elevated temperatures. A columbium addition of approximately 0.4% to 1.0%, as found in type 347, creates non-susceptibility to carbide precipitation which can cause intergranular corrosion.

In addition to stainless steel, Grinnell offers welding fittings and flanges in carbon steel, nickel, Inconel, Monel, aluminum and brass.

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stainless steel welding fittings
Types 304, 347, 316

DESCRIPTION	SCHEDULE†	PIPE SIZE, IN.‡
90° Long Radius Elbow 45° Long Radius Elbow 180° Long Radius Return Straight Tee	5s, 10s, 40s, 80s	½ to 12
Reducing Tee	5s, 10s, 40s, 80s	¾ to 12
Cross (Straight and Reducing)	5s, 10s, 40s, 80s	1¼ to 12
Concentric Reducer Eccentric Reducer	5s, 10s, 40s, 80s	¾ to 12
Lateral (Straight or Reducing)	5s, 10s, 40s, 80s	1 to 12
Cap	5s, 10s, 40s, 80s	½ to 12
Lap Joint Stub End-Long	10s, 40s, 80s	½ to 12
Lap Joint Stub End-Short	5s, 10s, 40s,	½ to 12

† 5s is Featherweight, 10s Lightweight, 40s Standard, 80s Extra Strong.
‡ Larger sizes available on special order.

stainless steel flanges

150 lb. and 300 lb. Steel Flange Standard *(Higher series available on application).*

DESCRIPTION	PIPE SIZE, IN.
Welding Neck Slip-on Lap Joint Threaded Socket Type Blind	½ to 24

150 lb. Corrosion Resistant Standard. *(For use with schedule 10s and 5s pipe. Rated at 150 psi at 500°F, 225 psi at 150°F, when used with full-faced gaskets).*

DESCRIPTION	PIPE SIZE, IN.
Buttwelding Slip-on Blind	½ to 12

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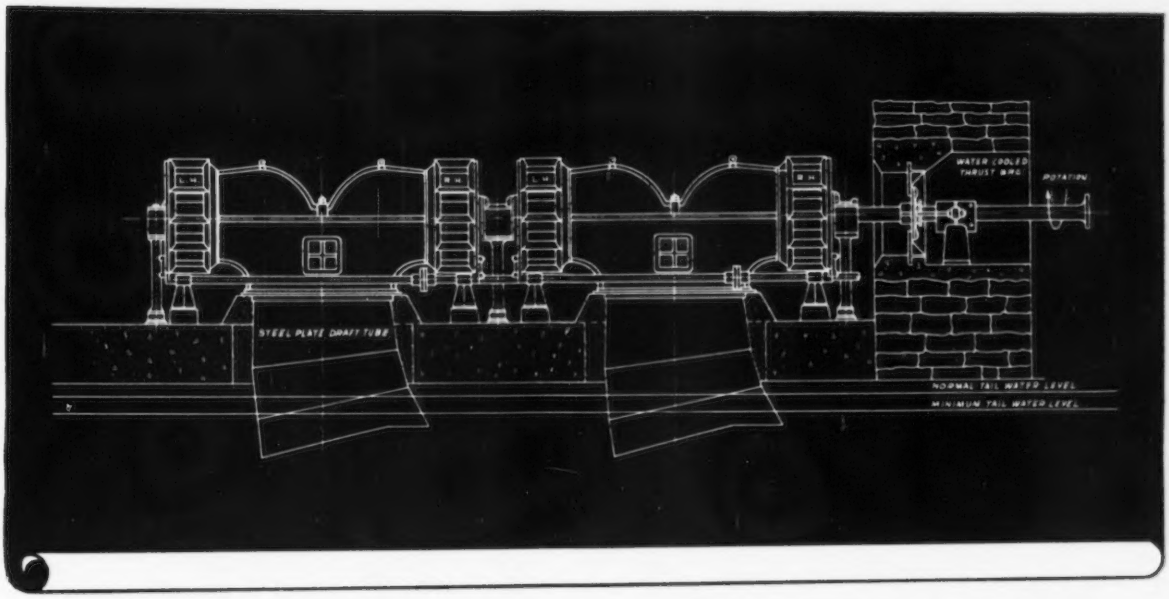

LEFFEL *Powers* the Paper Industry

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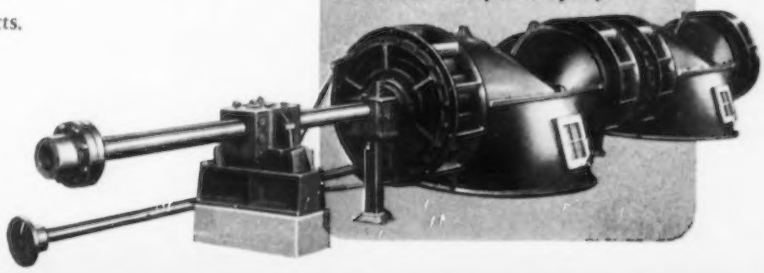
Penobscot Chemical Fibre Company
West Virginia Pulp & Paper Company
American Writing Paper Company
Escanaba Paper Company
Claremont Paper Corporation
Brownville Board Company
Kimberly-Clark Corporation
Gould Paper Company
Missisquoi Corporation
Fox River Paper Corporation
Combined Locks Paper Company
Marinette Paper Company
Neenah Paper Company
Nekoosa Edwards Paper Co., Inc.
Rhinelander Paper Company

The blueprint at the top of this page is a typical Leffel turbine paper mill installation diagram, prepared by Leffel engineers for a customer. At the right, below, is the special paper mill turbine diagrammed in the blueprint. Four wheels, two draft chests. All parts, including the large draft-chest castings, were produced in our plant.



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REMEMBER THESE DATES

MAY 18, 19, 20: National Paperboard Assn., Spring Meeting, Santa Barbara Biltmore Hotel, Santa Barbara, Calif.

MAY 21-22: Measurement & Control Conference sponsored by TAPPI Engineering Div., TAPPI Lake Erie Section, Cleveland Section of American Society of Quality Control and Cleveland Section of Instrument Society of America; Carter Hotel, Cleveland, Ohio.

MAY 25-27: TAPPI Fourth Coating Conference, Netherland Plaza Hotel, Cincinnati, Ohio.

JUNE 4-6: Technical Section, C.P.P.A., Saranac Inn, Saranac, N.Y.

JUNE 9-11: American Pulp and Paper Mill Supts. Assn., National Meeting, Atlanta-Biltmore Hotel, Atlanta, Ga.

JUNE 15-17: Forest Products Research Society, 7th National Annual Meeting, Memphis, Tenn.

OCT. 26-29: TAPPI Engineering Division, Sheraton-Mount Royal Hotel, Montreal, Que., Canada.

NOV. 18-20: 7th TAPPI Alkali Pulping Conference, Rice Hotel, Houston, Texas.

PAPER TRADE JOURNAL

APRIL 24, 1953, *Vol. 136, No. 17*

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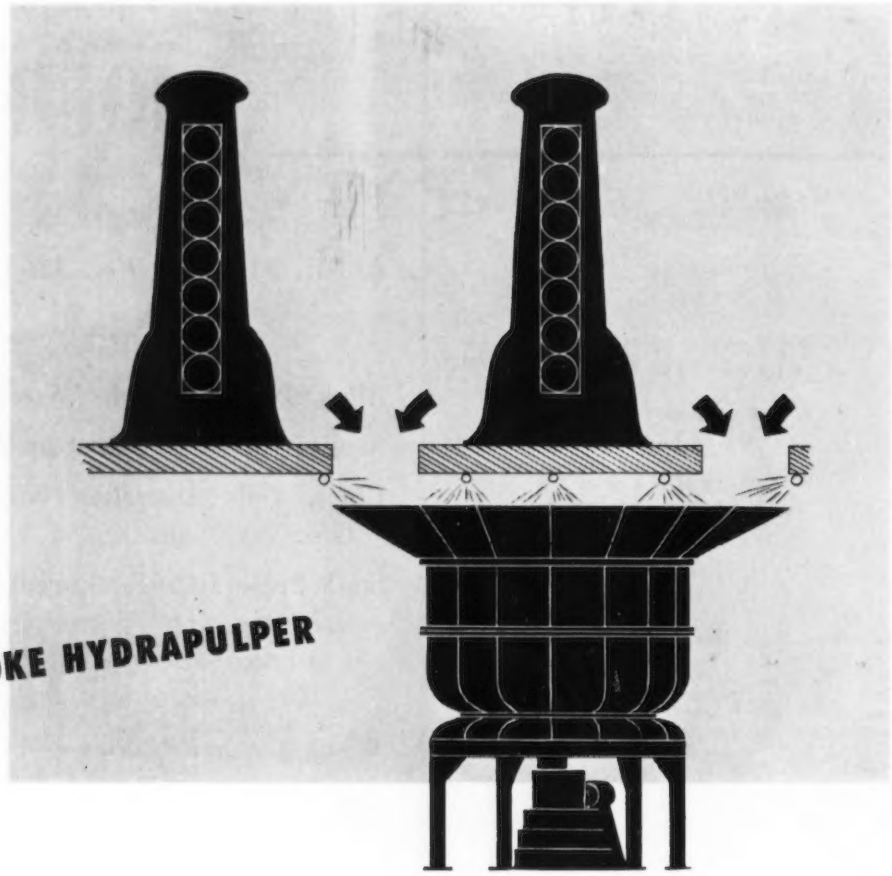

TO BIG CANADIAN MILL

Recently The Anglo-Newfoundland Development Company, Grand Falls, N. F. installed their 5th broke Hydrapulper—sale by our Associate, The Alexander Fleck Ltd.

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- Sonoco Products, 12 in two mills.

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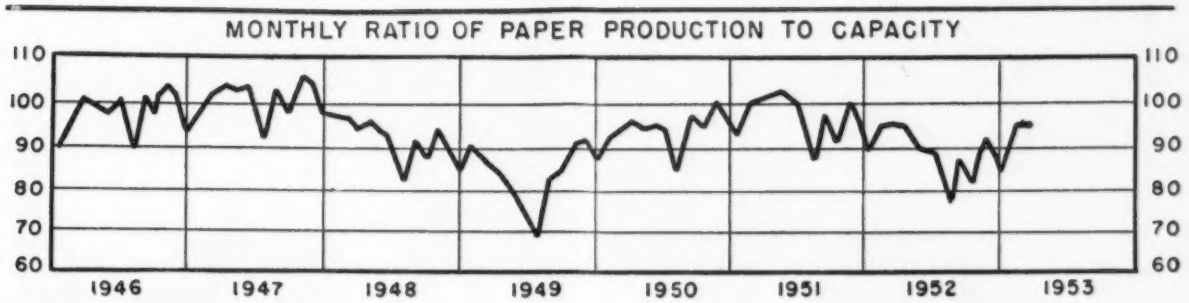
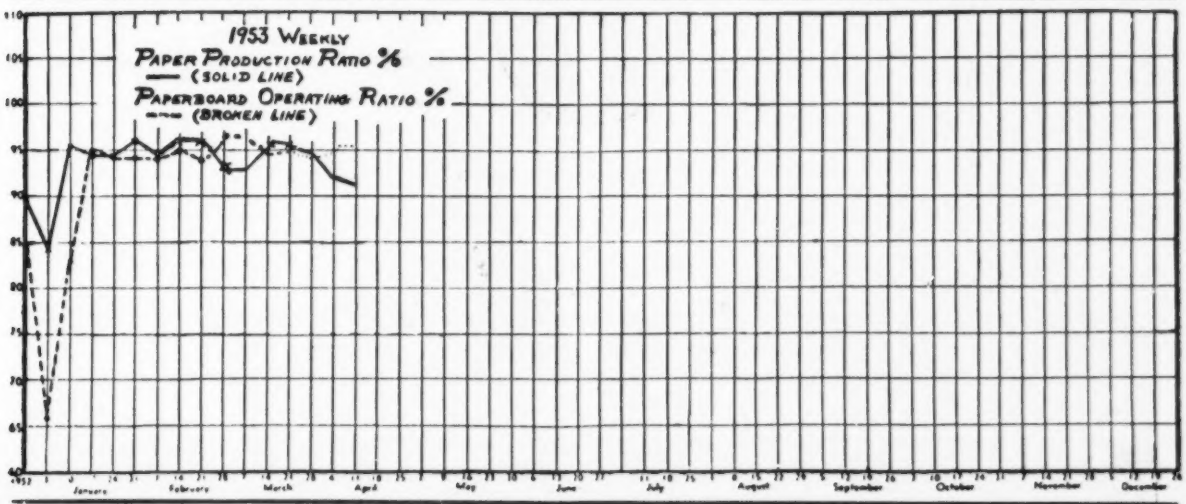
OUR BUSINESS



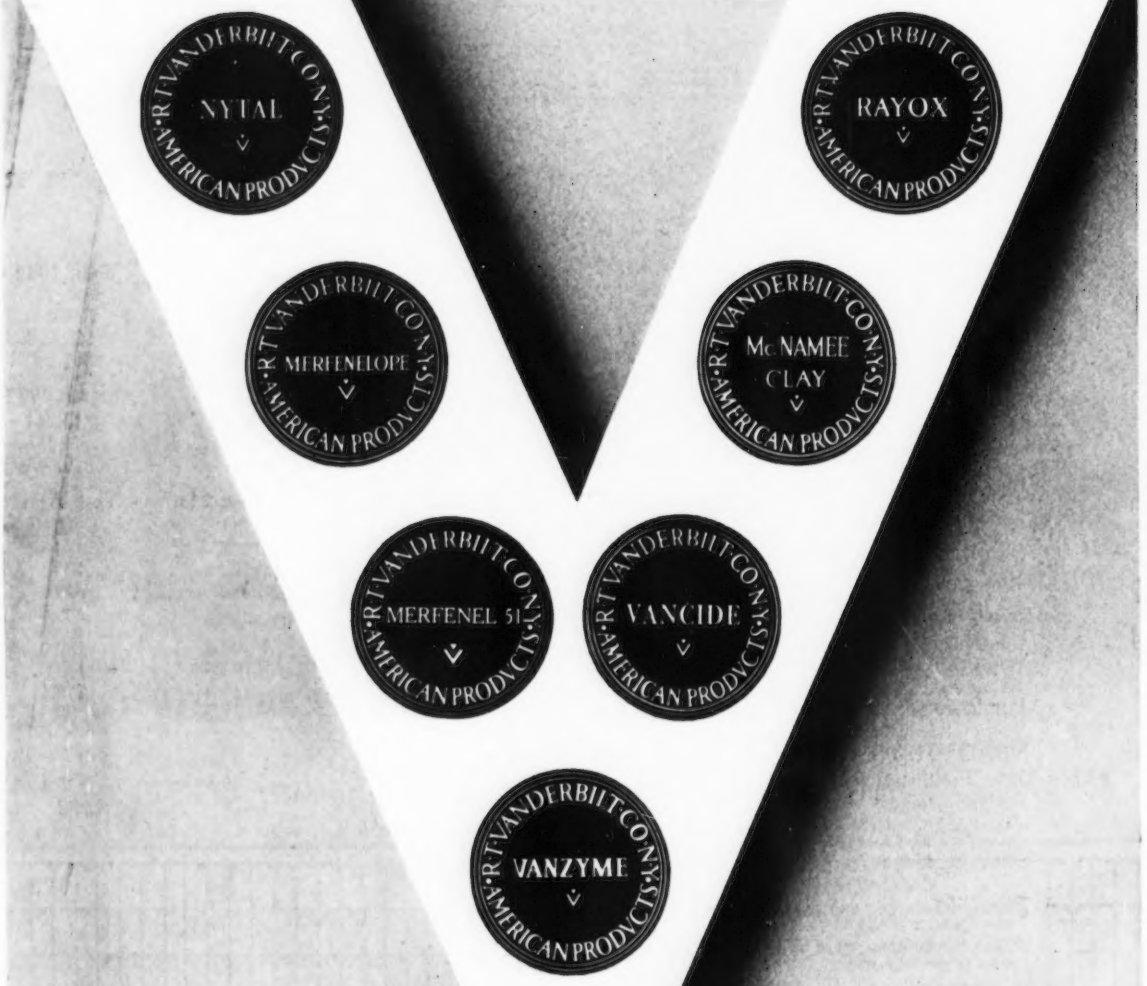
Brief of Important Figures

Source	Production	WEEK ENDING Apr. 11, '53	Mar. 14, '53	Apr. 12, '52
APPA	Paper Production Percent Capacity[3]	91.9	96.0	90.9
NPA	Paperboard Operating Ratio Percent Inch Hours	90	94	81
		Feb. 1953	**Jan. 1953x**	**Feb. 1952**
APPA[7]	Paper Production* (Except Newsprint and Building Papers) ....Tons	806,000	874,324	877,000
	New Orders ....Tons	800,000	886,207	848,000
	Unfilled Orders ....Tons	818,295	814,892	929,628
	Shipments ....Tons	796,000	865,061	851,000
		March 1953	**Feb. 1953**	**March 1952**
NPA	Paperboard Production ....Tons	1,240,925	973,807	813,744
	New Orders ....Tons	1,399,187	968,697	844,303
	Unfilled Orders ....Tons	567,535	437,345	380,443
	Our Customers Activities Index[1]	**Latest Mo.°**	**Previous Mo.°**	**Year Ago°**
FRS	Durable Mfg. Index	314	311	280
	Nondurable Mfg. Index	192	193	184
	Printing and Publishing Index	167	172	170
ODC	Magazine Advg.-Printer's Ink Index	394	394	379
	Prices Index			
BLS	Consumers Price Index[1]	209.0	209.6	210.9
	Wholesale all Commodities[4]	109.9	109.6	113.0
	Wholesale Pulp, Paper[4] and Allied Products	115.8	115.9	118.2
	Purchasing Power of Dollar, Consumers Prices[4]	87.7	87.5	88.3
	General Activity Index			
FRS	Mfg. Production-Worker Payroll[4]	145.8	149.6	130.4
	Unemployment Compensation Initial Claims (M)	1,074	1,126	1,382



[1] 1935–39 = 100 Unadjusted Index.
[3] New 6-7 day basis.
[4] New Index 1947–1949 = 100.
* For details see APPA Monthly Statistical Summary—February 1953 Estimated Figures.
° Latest Month Available on Request.
x Revised Figures. N.A.: Not Available.

Products for the paper industry



R. T. VANDERBILT CO. INC.

230 Park Avenue, New York 17, N. Y.

PAPER TRADE JOURNAL TRENDS

Does Industry Output Dip? Or Decline?

While there may be substance to the belief that the paper and paperboard markets are temporarily reacting to peace moves, the actual reason for the April 11 drop is hard to pinpoint. Some see in it a seasonal decline. Others feel the Easter season was slightly responsible.

Paper production ratio for the week ended April 4 dropped to 92.1 percent from the March 28 figure of 94.3, and stood at 91.9 for the week of April 11—latest report. The board industry's figure for the week ended April 4 was 95 percent, compared with 94 percent in the previous week. Production ratio for the week ended April 11 was reported at 90 percent.

Held likely is that the decline in paper output will be sustained for the week ended April 18 and thus indicate the seasonal decline has started. In some segments of the industry, the volume was reportedly restored during that week, however.

In boards, industry sources have been unable to detect any seasonal pattern in buying since pre-Korea. It could be that the Spring decline is setting in.

FLASH! Boards recouped to 95% April 18. Towels and toilet tissue add to gains.

Boxboard demand is strong . . . . .

The board market continues close to its high level activity at prices firm and unchanged, for the most part.

Exceptions include the price cutting stemming from those mills which were closed by strikes for many months. They are now actively competing for plain chip and filled news business, in particular, and nibbling at folding boards.

Areas in which this competition is concentrated are New York and Philadelphia, though some offers have reached eastern Massachusetts, according to our reports. New York City price for plain chip ranges between $65 and $70. Large producers have not dropped their prices from the $80 level, and outside of New York City, the price is quoted at $85.

Price for filled news in New York City also is about $65/70. Large mills which do not sell in this market have an unchanged price of $82.50/87.50 for this grade.

Backlogs small in proportion . . . .

Common to all types of boards is the small order backlog. Overall industry tonnage for the week ended April 11 was equal to some 2½ weeks of production at 554,127 tons. (See Table.)

Consumers are buying to current needs on a hand-to-mouth or week-to-week basis it is said, and their rush orders are a problem, costwise, to the mills. Prerequisite to landing the order is assurance of prompt delivery. Should this entail machine overtime, costs are added—at a time when purchasing agents are pressing for lower prices.

Folding cartons are firm . . . . .

Folding box grades are enjoying an excellent volume of business at firm and unchanged prices, box-makers report.

One of the largest, Robert Gair Co. Inc., reported a rise in its first-quarter net income equal to 75 cents per share on 2,179,888 shares of common stock, compared against 67 cents on 1,779,888 shares in 1952's quarter. The company's president, George E. Dyke reported that the various industries buying Gair cartons are piling up stocks of consumer goods which may later prove excessive and induce a third-quarter drop off.

Notable in this segment of the industry perhaps more than in any other are fresh ideas, expressed in design of package, new wraps, use of printed foils and gravures—all aimed at drawing out more of the consumer's purchasing power through ingenious packaging, displays, etc.

Bleached krafts displace WPC? . . .

Said to be a trend in some areas is the growing use of bleached kraft boards in preference to white patent coateds. Box-makers hold that the bleached kraft has opened up new uses in frozen foods, milk containers, bakery goods packages, etc.; but that where printing surface is desired, the white patent coated has by far the best sale.

Container outlook, 1953 . . . . . .

An encouraging outlook is presented for containers and packaging, according to the Spring issue of "Containers and Packaging," ODC, U.S. Dept. of Commerce.

Excerpted by geographical locations, the first half of 1953 for *New England* for container operations was held to be "good"; with improved business conditions likely to continue for corrugated boxes.

New York.—Manufacturers of containers were hopeful about the first and second quarters of 1953, and viewed the distant future favorably also. A moderate decline in box sales was held likely to follow the high level of the year's first quarter, with no changes of any consequence in the price of either boxes or raw materials.

Middle Atlantic.— All producers maintained an optimistic outlook for container operations for the immediate future. The sharp improvement in box inquiries and firm purchases added to the industry's optimism.

North Central.—Corrugated shipping container prospects held to be good with volume steady in the first quarter and a probable tapering off in the second quarter, 1953. For folding paper boxes, an encouraging outlook was presented by the substantial volume of business carried over into the early months of the year. For setup boxes: future business prospects were seen as good.

Midwest.—Manufacturers expressed confidence in the near future with the consensus varying from "stable to improved." On folding boxes, a sufficient volume was anticipated for the year's first quarter to provide an "acceptable" profit.

West Coast.—Both general level of demand and orders on the books was impressive at the year's outset. For folding paper boxes, only a slight decline in demand was expected; and for setups, a normal turndown in business during the first quarter, with a possible overall level which would equal or be slightly below the 1952 quarter.

Boxboard Production by Grades
Short Tons

	Feb. 1953	Feb. 1952	Jan. 1953
Container board, total	505,571	448,904	558,593
Liners	336,871	303,439	376,349
Corrugating Material	142,324	121,509	152,833
Container Chipboard	26,376	23,956	29,411
Bending board, total	284,913	247,536	282,891
Folding boxboard	196,271	170,722	195,258
Special foodboard	74,268	64,333	74,325
Others	14,374	12,481	13,308
Nonbending board, total	69,708	61,069	72,729
Setup boxboard, unpasted	58,163	53,197	61,509
Other	11,545	7,872	11,220
Special paperboard stock	82,073	84,806	91,967
Cardboard	12,845	5,877	12,136

*Bureau of Census figures.

Canadian Pulp Prices Unchanged

Contrary to price information which last week appeared in a Boston business paper, the price of Canadian unbleached sulphites is firm and unchanged at $130, as announced April 1—rather than $125/135 as reported. —E.P.N.

Paperboard Production (Tons)*

	April 11 1953	April 4 1953	April 12 1952
Production	235,635	251,974	198,938
New Orders	223,165	364,392	173,738
Unfilled Orders	554,127	567,535	423,844
% of Activity	90	95	81

*Source: National Paperboard Assn.

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(Subsidiary of Crucible Steel Company of America)

WEEK OF PAPER TRADE JOURNAL APRIL 24, 1953

Alaska Juneau Considers Wood Pulp Operations

The Alaska Juneau Gold Mining Co. may start wood pulp manufacturing, C. A. Norris, president, informed stockholders in the annual report. The company's Alaska mining operations have been shut down since 1944.

Directors have prepared the way for pulp operations by granting a short-term conditional option on some of the company's physical assets, including power plants.

If a pulp company is formed, Mr. Norris said, the mining company will receive a minority but substantial and equitable stockholders' interest. The pulp company also would agree to supply Alaska Juneau with electric power as needed if mining operations are resumed. A pulp plant probably would be located close to Juneau and Douglas.

Gould Plans Hydroelectric Plant

Gould Paper Co., Lyons Falls, N. Y., will construct a hydroelectric power plant on the site of its abandoned pulp mill at Gouldtown, on the Moose River, a few miles from the paper mill.

Company officials said that an existing "head" of 45 feet, created by two dams at Gouldtown, will be utilized to develop 1,000 kilowatts of electrical energy (about 1,333 horsepower).

A 100-foot penstock which formerly carried water for the old pulp mill's wheel is still usable, it was said, and a second-hand generator has been bought.

The structure on the river bank, now used as a storehouse and once the pulp mill until a disastrous fire in 1928, will be altered and about half of it used as the powerhouse.

The electricity generated will be transmitted by wire to the company's mill at Lyons Falls, one and a half miles across country, and will supplement the power used there for the company's paper making operations.

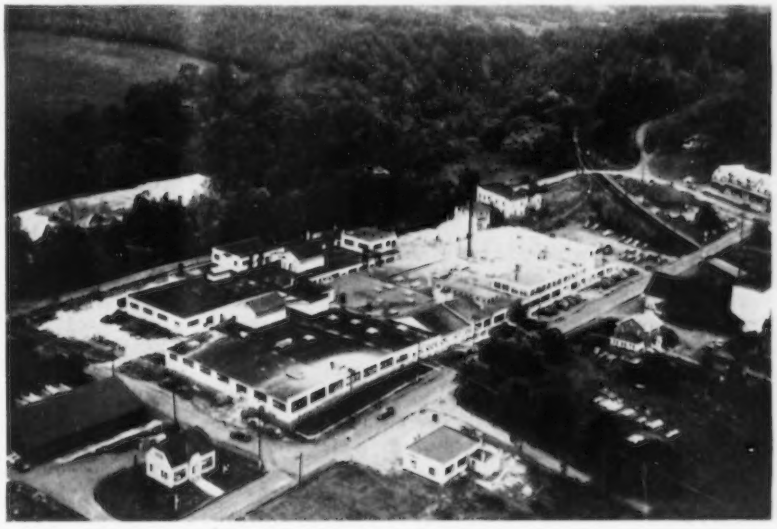
The operation of the power plant will be automatic, it was said, requiring little extra personnel except for maintenance.

The project, for which plans have been drawn and materials ordered, has been delayed temporarily, officials declared, but should be underway in "two or three months."

Rayonier's Hoquiam Mill Back in Production

Rayonier, Inc., pulp mill at Hoquaim, Wash., which has been down since April 1, was scheduled to resume operations April 22 on a 24-hour 7-day week basis. The paper mill reopened April 11 after a closure of several weeks for installation of new equipment.

It was reported that the Shelton division of Rayonier will shut down next week for approximately a month, in order to keep inventories in line with current sales.



Smith Asbestos Acquired by National Gypsum

National Gypsum Co. has completed arrangements for the acquisition of Smith Asbestos Products, Inc., Millington, N. J., manufacturers of asbestos papers for siding and shingles. The sale price is approximately $600,000. Under the agreement, National Gypsum Co. will exchange about 27,900 shares of its common stock for all the physical assets of Smith Asbestos. The acquisition does not include Smith Asbestos' corporate name, charter or product names. The plant will be operated as a company unit, not a subsidiary.

Melvin H. Baker, chairman of the board of National Gypsum, said new equipment will be added and existing machinery modified to enable the plant to make roofing and siding shingles and flat asbestos-cement sheets for industrial use. About 100 workers are employed in the 140,000-square-foot plant. Mr. Baker said the purchase "rounds out our position for the manufacture of asbestos products." Products of the new plant will be distributed in the Middle Atlantic and Northeastern States.

The Smith Products Mill, formerly Asbestos Ltd., Inc., contains two 2000-pound beaters, two 56-in. cylinder machines (54-in. trim), and two wet machines. It lists a past average of 100 tons per day. Former officers of the company were H. F. McFarland, Jr., president; H. J. Dowd, vice-president; R. D. Cross, secretary-treasurer.

With this latest purchase, National Gypsum will have acquired in less than a year three companies with ten plants for about $7,850,000 in its common stock. The acquisition of Smith brings to 36 the number of National Gypsum's plants in 23 states and Canada.

Union Tells Australian Workers to Return Company Bonus

Australian Paper Manufacturers Ltd. has initiated an incentive payment scheme for its workers, and a first bonus averaging £3 per worker was recently offered. But the Australian Council of Trade Unions immediately called a conference of representatives of 20 unions which rejected the incentive scheme and asked employees to hand back payments to the company through union representatives. A spokesman for the company said: "We cannot understand the union's opposition to the scheme. We have given guarantees that no men will be put off or paid less than the award rate because of the scheme, and if the men hand the money back we will hold it for them until this business is worked out."

Australian Papers Manufacturers Ltd., are the largest company in the industry, having five mills producing pulp, paper and board.

A prominent morning newspaper, in a leading article, says: "The statement made by a spokesman of Australian Paper Manufacturers Ltd. makes more inexplicable than ever the decision of the various unions to ban the incentive system which that company has introduced. The spokesman added that a representative of the unions had been invited to join a study group to see that the unions were satisfied with the standard set as a fair day's work. The unions did not appoint anybody but the company went ahead and established a standard under which the employees were due for a week's bonus of approximately £3 a head. A conference of unions rejected this scheme . . . This scheme is not bribery, it is common sense. The £3 a week is not a bait dangled in front of the men to make them work harder. It represents money they have already earned under an incentive plan which their unions are urging them not to accept. There has not been a whisper of complaint about these men having been worked harder or overworked. Minutes saved on each operation has been mentioned as the basis of the scheme and it is to be presumed that this £3 a head bonus represents the minutes saved under the bonus formula against the standard time set for each job."

Five-Row, Full Bed Transplanting Machine—The above planter, designed and built by Harry Liebig, Nekoosa-Edwards Paper Co., replaced three two-row planters at NEPCO'S Port Edwards nurseries. Built around an Allis-Chalmers tractor, the machine can plant 85,000 transplants per day. Two men ride front end, and three ride back end. Main advantage is that the machine produces more uniform rows of trees.

Maine Paper Companies Oppose Strict Pollution Control Bill

At a recent hearing in Augusta, Me., before the state legislature's Natural Resources Committee, spokesmen for five Maine paper companies voiced their objections to a bill making all Maine industries subject to licensing restrictions before being allowed to dump waste into any waterways. Two paper union locals and the State Federation of Labor, AFL, were also represented among the opposition.

Arguments against the proposal generally stated that it offered too rapid and too expensive a cleanup program. Paper spokesmen predicted that the bill would be impossible to administer.

Companies opposing the move were International Paper Co., Brown Co., Oxford Paper Co., Hollingsworth & Whitney, Great Northern Paper Co., and Eastern Corp. Summarizing the position of the paper industry, Leonard Pierce, representing International and Brown companies, said that licensing of all mills could result in a shutdown of many of them because the State Water Improvement Commission could not complete its job of classifying state waters according to usage before the bill became law.

All opponents to the pending bill supported, however, the commission's long-range anti-pollution plan which carries no time limit for enforcement.

Honor 36th Anniversary of Sutherland Paper

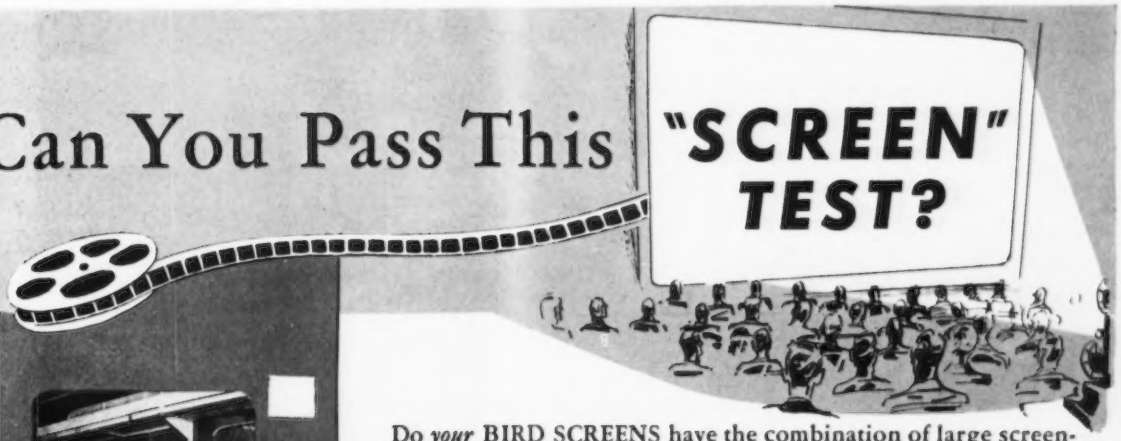
The Sutherland Management Assn. which was founded by W. Race, president of Sutherland Paper Co., held a special April meeting to honor the 36th anniversary of the incorporation of the company.

The association invited as guests to this meeting all officers of the company. Two plaques were presented—one portraying the Sutherland Paper Co. as it appeared in 1921 was given to L. W. Sutherland, and the other for W. Race was a profile of himself.

Plans to Make Rayon from Bagasse in P. I.

Oscar Kohorn & Co., Ltd., 501 Fifth Ave., New York City, reports that it will build and operate a $30 million bagasse-to-rayon fabric plant at Negros Occidental, P. I., for Rayon Corp. of the Philippines of which J. Amado Araneta is the organizer. According to Oscar Von Kohorn, president of the company which bears his name, this is the world's first complete rayon plant utilizing sugar cane waste.

Can You Pass This "SCREEN" TEST?



Do *your* BIRD SCREENS have the combination of large screening area, fine screen slots, gentle screening action and non-ferrous construction that is essential for meeting today's standards of quantity and quality paper production?

There are still some seven hundred Bird Screens in service that cannot fulfill these specifications because they are too old and out-of-date.

Are *your* BIRD SCREENS equipped with *Bird Oscillating Shower Pipes* to keep the screen slots clean and open and to use a minimum of shower water — far less than that required by ordinary showers?

Old type showers may be readily replaced by Bird Oscillating Showers which quickly pay for themselves.

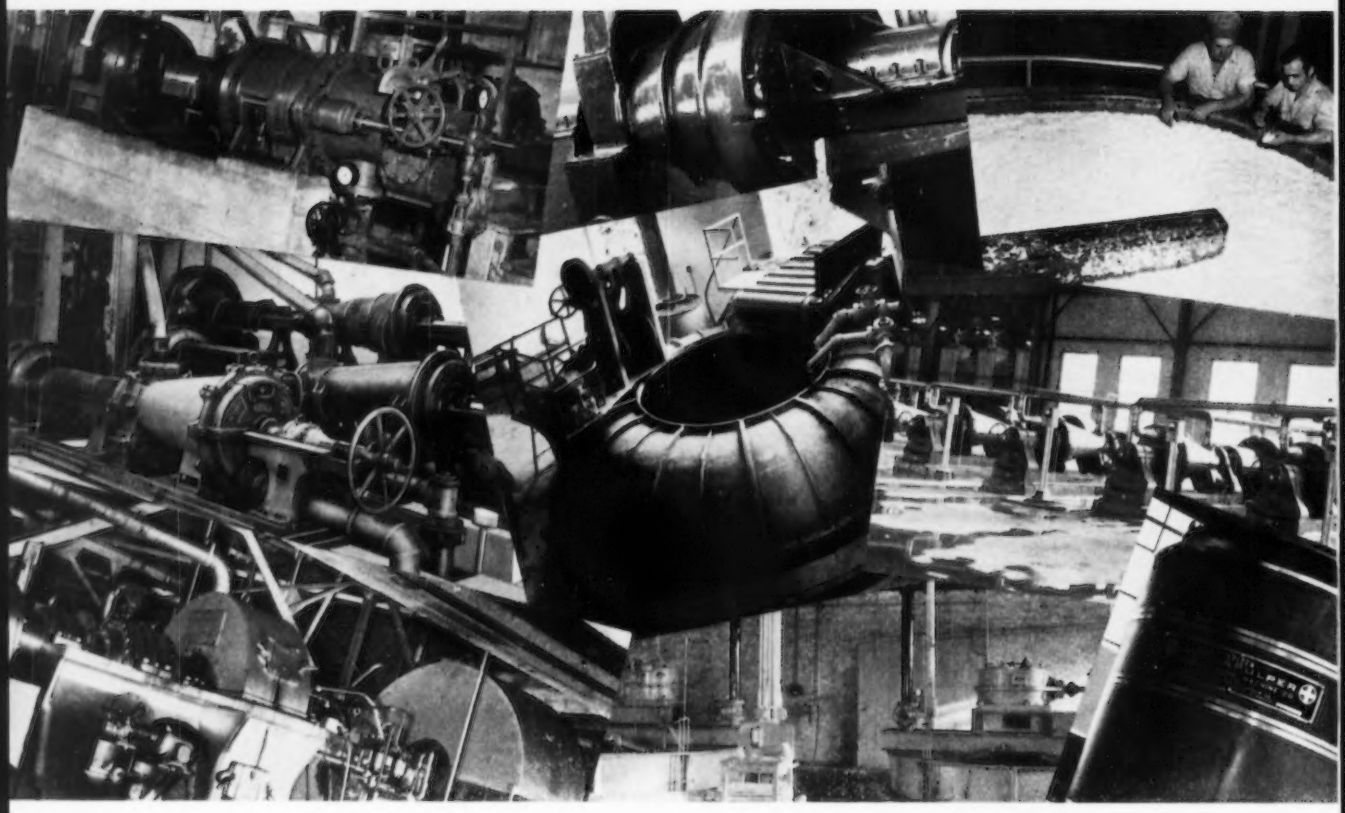
Are *your* BIRD SCREENS equipped with *Dirtec Tailings Units* which handle up to two or three times the volume of tailings otherwise handled, assuring clean stock, high screening efficiency and no waste of good fibres?

Dirtecs (one per Screen) are easily and inexpensively applied to existing Screen installations to replace the old and far less effective auxiliary screens.

If your answer is "Yes" to all three questions you have a screening installation that will make better paper and more of it per day at lowest screening cost per ton.

BIRD MACHINE COMPANY

SOUTH WALPOLE • MASSACHUSETTS



Some of the different machines discussed by R. Burke Morden in his paper . . . . .

Stock Preparation Equipment[1]

Part I

Background

Stock preparation is one of the most interesting, elusive and critical of the many fields that enter into the making of any paper or board. Stock preparation is the middle ground between the pulp mill and the paper machine. There is an old saying that "paper is made in the beater." Since in times past, the beater was used for all of the phases of stock preparation, this is the same as saying that "paper is made in the stock preparation equipment." However, as in many other subjects, it is not quite this simple.

First, there are many methods of preparing pulps before they reach the stock preparation equipment, each of which introduces a variable that must be dealt with in such equipment. After all, this equipment can only assist in developing the qualities that are inherent in the pulp presented to it. No matter how efficient the equipment is, it cannot make a good fiber out of a poor one.

Second, no matter how the stock has been prepared, its subsequent running over the paper machine will further affect the end product. There are numerous proven situations of two nearly identical paper machines, preceded by the same stock preparation equipment and served with the same pulp, that do not produce identical papers.

R. B. Morden
President, Morden Machines Co.

Third, within the stock preparation field there are many variables in the types of equipment and the handling thereof that will have a decided effect on the end product.

There is still a great deal that we all have to learn before stock preparation can be called a science. Today there are many theories on the nature of the cellulose fiber and what is done in preparing it for a particular use. The fact that there is room for a number of theories in itself indicates that stock preparation cannot yet be called a science and that it is in the borderland between art and science. Each year we learn more; the theories gradually come closer together,

[1] A lecture delivered at the University of Maine, February 12, 1953, before the class on Pulp and Paper Mill Equipment in the Pulp and Paper Technology course.

and it may well be that one of you or your contemporaries will make very definite contributions in completing the transition from art to science in the field of stock preparation.

By way of illustrating the reasons for saying that stock preparation is an "elusive" field, let's look briefly at the variables that enter into it:

Fiber Sources and Characteristics

We have first the various sources from which the fiber is obtained and the different characteristics imparted by each of these sources. The way a cellulose fiber must be treated in terms of given end results will vary with its source—such as rag, softwoods, hardwoods, straw, paper stock, and so on. These characteristics are further affected by the particular types of softwoods or hardwoods or whatever the source may be. These again are affected by the area of the country or the world in which the same source may be grown. It is interesting that in an industry as large as the paper industry no one has succeeded to date in pinpointing the exact variations in the nature of the fiber from the various sources and exactly what should be done differently to each fiber in its preparation and treatment through to the end product.

Effect of Pulping Process

Another variable that enters into the field is the manner in which the raw material from each of these sources is reduced to pulp. In one of the simplest forms you have groundwood pulp. Then there are the chemical cooks, such as sulphite, sulphate, soda, semi-chemical and the effect of various bleaching processes on each of these pulps. Each of these types of pulping impart certain general characteristics of handling to the fiber. In turn, in many furnishes, fiber from the variety of sources and a variety of pulping processes may be combined into a mixed furnish and various additives may be added to the furnish—such as starch, size, alum, etc.—each of which has its own individual effect on the overall treatment.

Other Considerations

Each furnish—whether it be all of one pulp or a mixture of various pulps and additives—must be developed to meet a given set of specifications in the final sheet of paper or board. Certain test properties are in conflict. For instance, it is the general experience that a sheet that is high in tear will be low in mullen, or vice versa. Thus tear and mullen are inherently in conflict with each other and mills often must strive to develop the maximum of both of these qualities in a sheet of paper to meet certain specifications.

All through the papermaking process results are further affected by the capabilities of the equipment used, not only to treat the various fibers, but also to prepare them into pulp and ultimately to form them into a sheet of paper or board.

Last—but by no means least—results are very definitely affected by the capabilities of not only the men managing the procedure, but also the men operating the equipment for the stock preparation and the balance of the pulp and papermaking equipment. No matter how good the equipment is that is available for all these processes—it has been proven time after time that, unless men understand the equipment and are interested in and capable of operating it properly, the equipment may be operated so that the results of which it is capable are not obtained. This again points up that there is still a lot of "art" in papermaking, and mills are constantly on the lookout, not only for well trained and capable men, but also for equipment that is as foolproof and versatile as possible, and—as some have said—"will help in taking the human element out of stock preparation and papermaking."

When you consider the myriad variables that have been enumerated above and the thousandfold combinations obtainable from them, it is truly amazing that such a great variety of critical paper specifications are satisfactorily duplicated from day to day by our various paper mills. When you add to this the fact that the theory and effect of many of these variables are not thoroughly understood, you can realize why stock preparation is a fascinating and elusive field.

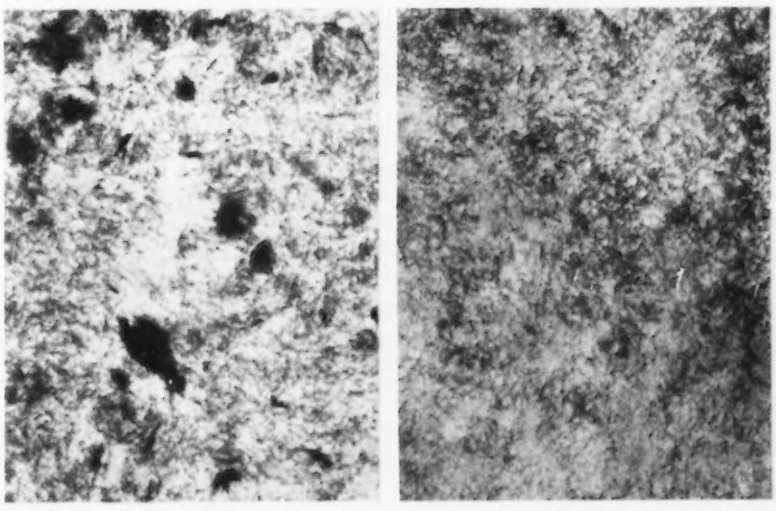
From this background of the basic variables and problems, you will realize that it would be presumptuous for anyone to attempt to evaluate completely all of the theories and equipment in the field of stock preparation. Until stock preparation completes its transition from an art to a science, all that each of us can do is to study and analyze and compare our day-to-day experience and draw upon these experiences and observations in formulating an approach to, and system for, stock preparation.

Today I shall try to outline from my own experience, as simply as possible, the basic theories and requirements that I believe must be taken into account in a balanced system of stock preparation, and trace the general development and use of various types of equipment to meet these requirements. In this limited field alone, there are nearly as many theories of treatment as there are variations of equipment.

Evaluation of Different Equipment

Even seasoned mill operators may have their heads swim when trying to evaluate the plethora of stock preparation equipment—including beaters, refiners, jordans, pulpers, disc mills, and so forth—with the various types, such as the Hollander beater, Niagara beater, Horne beater, Thorson beater, Bertrams beater, Vortex beater, Victory beater, Rollofiner, Claflin, Fibrefiner, Fibremaster, Sutherland, Bauer, Sprout-Waldron, Hydrafiner, Dynafiner, Hydrapulper, Dynapulper, Pulpmaster, Fibrepulper, Apmew, Liebec, Noble Wood Mill, Unifiner and the various makes of jordans, and last—but not least—our own "Slush-Maker," "Stock-Maker" and "Stuff-Maker." If any well recognized names have been omitted, no slight is intended, for there are still many other items of equipment in the field.

Each of these pieces of equipment represents the effort of an individual or company to improve on some particular phase of stock preparation. The knowl-



A—Partially Pulped. B—Completely Pulped.

Figure 1—Degree of Pulping—(full scale photographs of dilute solution of kraft waste).

edge learned from one item of equipment has been the stepping stone to the development of others; and though we all realize advancement of the industry depends upon continuous improvement and development, it might be said that there is today available a wealth of good stock preparation equipment.

I wish there were an opportunity for each equipment supplier in the stock preparation field to present to you the salient characteristics and operating condition for his equipment.

In studying and comparing the literature of various equipment companies, you will find that each piece of equipment is indicated by experience to give a certain type of treatment and to perform best under certain specific conditions. The conditions of operation and type of treatment that apply to one machine may appear to be in conflict with those of another to obtain presumably the same end result. I recall a case of one equipment supplier (from a company not normally serving the paper industry) who was trying to develop a specific type of filling for a piece of stock preparation equipment using their company's material. In order to gain background, he spent a few days in a paper mill watching operations in the stock preparation end, noticed that one beater room foreman and machine tender set their beaters, refiners and jordans at very specific settings and were producing a given quality of paper. While he was there, the next shift came on—and the next crew substantially altered the setting of the various pieces of equipment. And in spite of their changing everything around, the final quality tests apparently were identical to those of the other crew. Whereupon the uninitiated supplier said, "I don't understand how they do make paper!"

I know that when I first stepped into this field it all looked very simple—so simple, in fact, that I thought I could theoretically set up a number of cubbyholes, each one containing a cut-and-dried answer to a given situation; but I long ago ran out of space for sufficient cubbyholes. Nevertheless, through the years we find in relation to our own equipment, and the same thing seems to hold true with other equipment, that there are certain basic, underlying patterns of operation that more or less consistently follow through. You will find that in many statements to follow I will say "tends to do this" or "in our experience does that." These are not intended to be evasive statements—only an admission that there are no firm cut-and-dried answers in all cases.

Fundamentals

From this background you may be in a better position to appreciate the complexity of establishing basic fundamentals for evaluating all of the items of stock preparation equipment. Realizing the complexity of the whole field, we must constantly strive to find the common denominators so that we can simplify, rather than multiply, the basic factors that must be met to achieve the desired results.

In so doing we must first have an idea of the make-up of a fiber and what is done to a fiber in the stock preparation equipment. Out of the various popular theories on the make-up of a cellulose fiber we gain a general picture of the construction within the fiber as follows:

Structure of the Fiber

Basically, the individual fiber is made up of various layers of fibrils wrapped around a core, or lumen. The fibrils lying near the center have a tendency to align themselves more or less longitudinally with the axis, and the layers toward the outside become more and more perpendicular to the axis. Around the outside of this wrapping of fibrils there is a tough, water-resistant well or shell known as the cambium layer. In preparing a chemically cooked fiber, most theories indicate that all the action is a mechanical process of bruising, crushing, rubbing, brushing, pounding, mashing or basically beating the fiber to break down or rupture the outer shell or cambium layer and allow the inner fiber to be exposed. A continuation of this process further brushes out or unravels the inner fibrils, and since they are receptive to water, this process also swells and expands the fiber and fibrils. This brushing out of the inner fibrils develops what is called fibrillation. The further this treatment is carried, the more fibrils are developed, and eventually some of these may be broken off, forming debris or fines. If the beating process is carried far enough, of course these fibrils may all be broken off and dispersed, and only gelatinous mass remains, which goes beyond the point of papermaking. In the mechanical treatment of the fibers, a certain amount of transverse cutting or shortening of the fibers can take place.

Hydration

The term hydration is often used in terms of the effect that is imparted to the fiber in the stock preparation process. Basically, this term hydration is not used in a strictly chemical sense, but rather to indicate the intimate association of water with the fiber. The more fibrils that are developed, the more easily the water associates itself with the fiber and makes the treated stock more resistant to drainage on the paper machine wire. In stock preparation systems this hydration or wetness imparted by treatment of the fiber plays a major role on how the fiber will operate on the paper machine and the final qualities that will be developed in a sheet of paper. In terms of today's production methods, we are constantly trying to develop the maximum strength properties in the fiber and at the same time not slow the drainage rate any more than necessary, for a slowing in the drainage rate of necessity slows the paper machine speed.

Effect of Treatment on Paper Properties

Next, let us explore briefly how this treatment of the fiber affects the properties of the final sheet of paper. Basically, treatment increases the strength and density in the final sheet. The more fibrillation is developed, the more capillary action can pull the surfaces together and assist in bonding one fiber to another. In this way the strength of the sheet is developed by the bonding, and the density of the sheet by the breaking down of the fibers so that they become more compact. By way of illustration, a sheet of soft tissue, which needs very little strength and density, requires relatively little treatment.

Going on to the middle ground, we find that various types of high-grade wrapping, printing and similar papers—which normally receive a medium amount of treatment—have good overall strength properties and fair density.

In carrying up to the higher degrees of treatment, such as in grease-proof or glassine, the sheet is very dense and transparent, but in general it has been treated beyond the point where strength properties are at their maximum. By the same token, the handling of the sheets treated to these various degrees will vary on the paper machine. The sheets with the least treatment will have the fastest rate of drainage and consequently can be run at faster speeds on the paper machine. The further the treatment is carried, the slower will be the rate of drainage and the slower will be the relative speed of operation on the paper machine.

In general, as the treatment is carried forward, the treatment develops the tensile and bursting strength inherent in the fiber up to a certain point and then the burst or mullen will drop off fairly rapidly and the tensile will diminish gradually. So far as the tear property is concerned, it tends to increase slightly at the start of treatment and then continually decreases as the treatment progresses. It is thought that this happens because tensile and burst development come about by increased cohesion between the fibrillated surfaces, and this imparts additional strength that shows on the bursting or pulling apart of the fibers. However, the test of tear is a tearing action across the fibers forming the sheet of paper and essentially measures the inherent fiber strength within the individual fibers. Since the treatment process tends to break apart and weaken the individual fiber, the tearing tends to decrease as the treatment in-

creases. By the same token density and shrinkage increase as the treatment progresses.

Freeness or Drainage

Freeness tends to become slower as the treatment progresses, and this slowness can be brought about by two distinctly different actions. Of course, the development of fibrillation will help in retaining water in with the fiber and will slow the drainage rate, but also if the fibrils are broken off or the fiber is cut, this debris will also tend to form a mat and unduly slow the drainage rate. The final test properties from these two types of slowness will be decidedly different. Basically, the more that slowness is developed by fibrillation and the less by cutting, the stronger will be the paper and the faster its operation on the paper machine. There are cases where, lacking fibrillation, due to the nature of the fiber or other reasons, density can be increased by cutting to develop a certain amount of debris for filler, or using short fibered stocks as a filler, and there are other cases in papers of low strength, such as blotting, where a cutting effect gives preferable qualities, but these are the exceptions that prove the rule.

Consequently, the freeness test—although worth while as a guide in day-to-day operation—can be very misleading when comparing operations in two different mills or on two different pieces of equipment.

Even many of the various words used in describing what is done to a fiber are elusive in their definition and may have overlapping or different meaning from one person to another. This brings to mind an experience in a mill where by feel I thought a stock was well brushed with very little cutting, and one of the operators, by feel, was certain it was cut. Subsequent examination under a microscope showed little or no cutting but a high degree of fibrillation. This fibrillation gave a slow feel to the stock, and in his experience he had obtained slowness by cutting and thought the fiber must be cut if it felt slow. It's all in your point of view and aften, in this field, two people find that they are using exactly opposite terms to describe the same effect.

Now that we have illustrated the nature of the fiber, what treatments can be imparted to it and the problems of defining these treatments, let's again try to boil this down into its simplest terms. From this description of how the fiber may behave undtr treatment, we find that stock preparation is divided roughly into three basic phases.

Three Phases of Fibre Treatment

1. Defibering—which means separating one fiber from the other in preparation for its individual treatment. This may mean the breakdown of the chips as they come from the cooking or the repulping of dried pulp sheets, broke, paper stock or the like, to make certain there are no bundles or fibers left together.

2. Brushing—which covers the development of the fiber in terms of fibrillation and hydration, with emphasis on the maximum development of each complete fiber, retaining and improving upon its essential properties.

3. Shortening—which covers cutting, shearing or splitting the individual fiber. This differs from brushing in that its emphasis is on the reduction of fiber length or width as compared with the retention of the complete fiber.

Pulping, Brushing and Jordanning

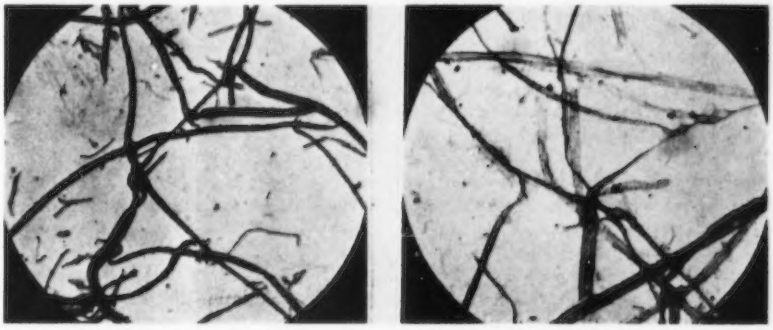
Refining, by definition, is the basic word that covers all of these phases, but through common usage it has become more narrowed in its definition. The first phase of defibering is most simply defined as *pulping;* the second, of brushing, as *beating;* and the third, of stortening, as *jordaning*. More recently there has developed a middle ground between beating and jordaning which borders upon and draws a little upon each and that, by common usage, is coming to be known as *refining*—wherein the refiner tends to give a combination treatment made up of some beating action combined with some jordaning action.

A study of the charts, diagrams and illustrations will clarify these phases of treatment.

Figure 1 "A" shows a partially pulped furnish, with some free fibers and some bundles of fibers. *Figure 1* "B" shows the same furnish after completion of the first stage of stock preparation, namely the pulping; each fiber is free of the other and is ready for individual treatment.

In *Figure 2*, "*A*" is a photo-micrograph showing fibers prior to any beating or jordaning. "*B*" shows the same fibres after a treatment that is predominatly beating. Note the so-called fraying and fibrillation imparted to each fiber with very little evidence of shortening. "*C*", on the other hand, shows the same fibers treated to approximately the same degree of freeness but by a predominantly jordaning treatment. A comparison of "*B*" *and* "*C*" graphically shows the difference between beating and jordaning treatment, and this is further reflected in comparing the tear factors. "*D*" shows the same fibers as in "*B*", except the beating treatment has been carried to a much further degree. Even so, the tear in "*D*" with twice as much beating treatment is better than in "*C*" with a jordaning treatment.

Most grades of paper require a correctly proportioned combination of these three types of treatment to develop the maximum test properties.



A—Untreated Pulp. Freeness—635 Can. Std. tear factor—85.

B—Medium Beating Treatment. Freeness—300 Can. Std. tear factor—85.

C—Medium Jordaning Treatment. Freeness—275 Can. Std. tear factor—55.

D—Heavy Beating Treatment. Freeness—75 Can. Std. tear factor—60.

Figure 2—Types and degrees of treatment (photomicrographs of unbleached sulphite).

Equipment

With this very much simplified version of the background of what must be accomplished on a fiber in the stock preparation equipment, let us next look at the development of equipment to give these treatments. In the earliest history of paper, the fiber treatment was given by pounding, bruising, crushing or beating the fiber by hand, using so-called stampers—as is still being done today in some parts of the world.

The development of the fourdrinier paper machine made it necessary to develop some means of treating fiber in greater quantities and more efficiently. This first expressed itself some 200 years ago in the development of the Hollander beater, wherein the effect given to the fiber by hand beating could be imparted to the fibers by the action of two opposing sets of bars immersed in a solution of pulp and water. The mechanical action of this principle of treating the fiber between two opposing bar surfaces is the common denominator of practically all present-day stock preparation equipment—whether between beater rolls and bedplates, conical rotors and shells or grooved discs. You will note this similarity as we trace through the development of the various items of stock preparation equipment.

The bars as shown in *Figure 3, Diagram "A"*, could be interpreted to represent those in a beater refiner or jordan and could be stretched to represent the grooving on the two opposing disc faces of a disc refiner. In the beater the bars in the roll are spaced well apart, with a relatively deep cell space between each bar. The bedplate has the bars closer together, with only a shallow cell space to help in holding the fiber up onto the bar face. In the jordan the cell spaces between the bars in both rotor and shell are more restricted, and in the disc machines, the grooves on the face of the discs give even more restriction.

A study of this diagram will indicate how the action of the two opposing sets of bars can give defibering, brushing, or cutting on the fiber. First, we have the body of pulp suspended in water between the two bar surfaces. The faces of the bars, whipping through the stock, maintain the stock suspension between the bars in a high degree of turbulence. Various fibers in this turbulent body are hung up on or stapled over the leading edge of the bar faces as a fiberage—or fiber mat—and in turn are brushed or cut between the opposing bars as the two surfaces pass over each other. Where the two opposing sets of bars are set with a fairly wide clearance between them, bundles of fiber will pass between the bars and be rubbed apart. As the clearance is decreased to more nearly a fiber thickness, the individual fibers are rubbed by the two bar surfaces and by each other, and the brushing action is obtained. If the bars are brought closer together so there is less than a fiber thickness between the bars, the fibers will tend to be cut or sheared as the bars pass each other. In its simplest form, this theory is back of practically all stock treatment equipment in commercial production.

Roll-Type Beaters

I mentioned earlier the old saying that paper is made in the beater. Since its development, the beater has been a stock preparation instrument that could be made to perform the three basic functions of stock preparation outlined previously.

The principle of the Hollander beater is shown in *Figure 3, Diagram "B."* An elongated tub is used with a longitudinal mid-feather which stops short of each end and separates the tub into two connected channels. A beater roll with a barred periphery is mounted in one of these channels. This roll serves to circulate the water and pulp suspension around in the beater tub. At the same time, the bars on the beater roll are working against the bars in a bedplate in the bottom of the beater tub to impart the treatment required.

In the Hollander beater, as in most later beaters, the height of the roll above the bedplate—which in turn governs the clearance between the two sets of bars and the type of treatment, such as defibering, brushing or cutting—is controlled by raising and lowering the roll through a lever arm that may be variously controlled. Beaters of this type are made in capacities that will handle from 500 to 3000 pounds of air-dried pulp at 3 to 5 per cent or more consistency. Depending on the capacity of the water, the roll may be driven with anywhere from 50 to 200 or more horsepower motors. Normally about half of this power is used in circulating the stock about the tub. Beating times may vary from 30 minutes up to eight or more hours, depending on the type of furnish and the amount of treatment required.

While on the subject of beaters, we had probably best carry on through and describe the various subsequent developments and improvements that have been made to and based upon the framework of the original Hollander roll-type beater.

These developments include modifications in the basic shape of the tub and the slopes in the bottom to improve circulation and eliminate the tendency of the stock to channel in some parts and hang up in dead spots in other parts. In one development the roll is located at the end of the tub, and the stock that flows on the inside of one channel passes under the roll and to the outside of the opposite channel to help in better blending and more uniform treatment. Baffles have been put ahead of the roll to direct stock down to the nip between the roll and bedplate to save the power of the roll whipping in a large volume of stock. The backfall has been raised to give the stock more of a head in aiding circulation. Hoods have been designed in some cases to prevent the stock from traveling on over the beater roll and, in other cases, to help in confining the stock around the beater roll.

Additional multiple bedplates have been added, generally up to three in number, to increase the effective beating area on each pass of the stock under the roll. In the majority of beaters, the roll is lowered against the bedplate, and in a few cases the bedplate is forced up against the roll.

In an attempt to put beating on a continuous basis, a series of beaters have been connected together, taking the stock out of one beater at the backfall, passing it through a trough into the next beater, and so on down the line.

Another earlier development of continuous beating involved confining a beater roll and bedplate, more or less in a jacket, and introducing the stock at one end, letting it travel around and down the length of the roll, directed by vanes, making a number of passes over the bedplate and out the other end.

Through the years there have been various developments retaining the beater roll and bedplate but eliminating the tub and substituting tanks or chests of various forms, pumping the stock from the chest to a spreading device for flowing the stock uniformly between the beater roll and bedplate and discharging back to a tank or chest, making the necessary number of cycles to give the desired treatment. This, of course, substitutes a pump to reduce the circulating power of the beater roll. The tanks or chests used for cycling are arranged so that all of the stock receives as nearly as possible an equal number of passes. More recently this system has been further developed to use a number of such rolls, with or without cycling chests or tanks, in series, passing the stock directly under a series of beater rolls with multiple bedplates.

Various effects and efficiencies are claimed for all these modifications and developments of the roll-type beater, but they in no way alter the basic bar-to-bar action on the fiber that we have outlined as the keynote to any stock preparation system. It is difficult to pinpoint exactly what each of these developments has contributed, but probably one of the greatest cumulative contributions through the years has been the realization of greater accuracy and precision in the beater's construction to more accurately control and maintain a true and uniform running relationship between the two opposing bar faces. When you appreciate the minute size of a pulp fiber and the fact

that this small fiber must be treated between two bar faces, you can realize how absolutely essential it is that precision control be maintained between these two bar surfaces. If there tends to be any play in the mounting of the roll, it will give varying clearances as the roll rotates, or if the bar faces do not wear uniformly and form a sawtooth type of pattern down their length, uniform full length pressures cannot be maintained between the bars.

Jordans

The second major item of stock preparation equipment to be developed was a conical engine developed by Mr. Jordan some 100 years ago and still called by his name. As shown in *Figure 3, Diagram "C"*, it differs from the beater in that the cylinder beater roll is replaced by a conical rotor carrying the bars generally parallel to the rotor's axis, and this in turn is surrounded by a conical shell, also containing bars. A continuous flow of stock is passed between these two members, normally introduced between the bars at the small end of the rotor and discharged at the large end. In effect you might say that this arrangement is somewhat comparable to a beater roll sourrounded by a 360-degree bedplate as compared with the 25 to 75-degree bedplate that is under the normal beater roll. This continuous-flow principle decreases the overall size of the equipment required and lessens the circulating power which is normal to the roll-type beater's operation. The conical form of the jordan permits adjusting the bar-to-bar clearances and pressures on the fiber by moving either the rotor or the shell up onto the other. Presumably the jordan was originally developed with two thoughts in mind—first, to provide a continuous treating instrument that could be used after the beaters and directly ahead of the paper machine to touch up any irregularities in the treatment of the stock as it came from the beaters and to assist in clearing any fiber bundles that might have persisted through the previous treatment. Second, there no doubt was the anticipation, since it employed the same basic bar-to-bar mechanical action on the fiber as the beater, that it might be able to duplicate all the various debundling, brushing and cutting actions of the beater and thus put all phases of stock preparation on a continuous basis with consequent savings in space, power and labor.

However, experience with the jordan indicated that it generally tended to cut the fiber more than was the case in the beater. Of course, it is impossible to do more than theorize on why this is the case, since it is impossible to observe the bar-to-bar action on the fibers within the beater or jordan. In my own attempts to analyze the differences, I have felt that there may be basic differences involved in the different ways in which the fiber is presented to and carried through the working areas. In the beater, the bars on the beater roll are like a paddle wheel in the solution, striking into a relatively unmoving mass of pulp solution and forming a more or less right angle alignment of the fibers across the bar face. Each of the cell spaces between the bars in a beater roll tends to be wider and deeper than in a jordan, and the turbulence established in these large cell spaces by the rotation of the roll probably contributes to the forming and reforming of the fiber films on the bar edge. In the beater the flow of stock through the treating elements is at right angles to the length of the bar, whereas in the jordan the flow is along the length of the bars as the stock travels the length of the cone from inlet to outlet. This quite conceivably could affect the way in which the fiber aligns itself on the bar edge and thus the way in which the bar-to-bar action affects the fiber. In addition, both the shell and rotor of a jordan generally have more restricted spaces between the bars than in a beater. This also could affect the way in which these fibers are formed on the bar edges. In addition, if a factor of soaking time, as the stock circulates around the tub, enters into the beater's operation, this factor is not present in the jordan's operation.

In the jordan, as in the beater, improved methods of construction have given more exact control over the bar-to-bar relationship and have definitely contributed to the efficiency of its particular-type of treatment.

A great many of the stock preparation systems in service today are a combination of beaters for brushing the fiber and jordans for touching up or cutting the fiber after beating, thus giving a balanced control of these two phases of stock preparation. The brushing of the fiber, where required, should always be done first in the process, since after a fiber has been shortened by cutting, it is much more difficult—if not impossible—to wrap it effectively over the bar edge for brushing. Once a fiber is well brushed, it becomes more flexible, and the jordan is much less apt to give as severe a cutting as when the jordan is used on raw and brittle stock.

Due to the ability of the jordans to give continuous treatment, there has been a tendency to attempt to use them for more and more of the fields of stock preparation to carry the advantages of the continuous production of the paper machine on back through the stock preparation. In this attempt some mills have eliminated the beating treatment entirely and have gone completely to jordan treatment. This appears to have worked out more or less satisfactorily when a relatively light treatment is required on the fiber and there has been no necessity to set the jordaning equipment up to its full load.

When the jordan was the only instrument for controlling the stock directly onto the paper machine, some mills came to believe that since they needed the jordan for final control, they must need jordan cutting in their sheet. With the development of other types of continuous treating equipment that also can fit directly ahead of the paper machine and give the same instantaneous control, many have found that on a variety of grades they can develop better test properties without jordan cutting.

However, it has been pretty well proven that where various types of paper specifications must be met, a combination treatment of beating followed by jordaning generally gives the most flexible system.

Refiners

Experience gained through the years in the use of both beaters and jordans, and the fact that most stock treatment requirements call for a combination of the two types of treatment, have led to the development of various types of what-for lack of a better term—we call refiners. The majority of these units have been an attempt to develop a combination of brushing and shortening action in one unit. These developments have followed two basic patterns, both of them striving so far as possible to attain the advantages of continuous operation in the least amount of space and at the least initial investment, and at the same time to provide for ease and flexibility and accuracy of control, along with economy of power and labor.

Some refiners have been called "high speed," but in many of these this is a misnomer. They may have a higher shaft speed than a jordan, but the diameter of their rotor is generally less than a jordan and the peripheral speed in most cases becomes about the same as in jordans. The same thing holds true between a slower running beater and a jordan, when you compare roll and rotor diameters. It is the peripheral speed that affects the fiber, and these are generally reasonably comparable.

It might also be said here that, in general, when comparing the most efficient of the present day beaters, refiners or jordans, for a specific amount and type of treatment on the fiber, about an equal amount of power will be expanded. Of course, comparing the most efficient of these types with older and more antiquated equipment of similar types will indicate that most present day equipment is decidedly more efficient from a power standpoint.

Conical Refiners

Getting back to types of refiners—we

have first the conical type, originating from the jordan. Developments along this line have included varying the pitch of the cone, pumping the stock through from the large to the small end instead of the more usual small to the large end. Various types and arrangements of the bars, continuous single-pass treatment as compared with cycling a number of passes on a chest, and most any other conceivable modification.

Out of these various concepts have been developed a number of conical refiners that are in use today, between them giving all combinations and varieties of treatments, ranging from the beater's brushing on through to the jordan's cutting. No one can be called a universal instrument, for all types of stock preparation. Many of them, either by themselves or in conjunction with other equipment, are used to good advantage under many conditions. In mills that are producing a standard grade of paper from a more or less constant pulp source, some of these units have been developed to give the combination treatment required for a particular condition and, in many cases, have achieved outstanding results. However, if such a machine is particularly susceptible to variations, it may not be best suited where types of pulp and grades of paper are constantly changing. Hence, what appears to be a complete success under one set of conditions may be disappointing in another.

Disc Refiners

More recently the disc-type refiners have been developed. These somewhat resemble an attrition mill, as shown in *Figure 3, Diagram "D"*. In place of a shell and plug, two generally vertical discs are used, either or both of which may be rotating. Stock enters through a passage into the center of one disc, and by centrifugal force passes outward between the discs to their periphery, where it is discharged. Each disc is fitted with a removable plate or plates, and these plates are covered with various patterns of grooving or texture which serve the same general purpose as bars in beaters, conical refiners or jordans. Disc machines must be well constructed to provide for accurate control between the disc faces, since a small amount of adjustment reduces the clearances to a much greater extent than is the case in a conical machine.

In disc refining the action on the stock differs from that in beaters or jordans in that the restricted spaces within a disc refiner generally require a greater amount of clearance between the two disc faces to pass the necessary volume of stock between the discs. This gives more of a fiber-to-fiber rubbing action and generally makes them particularly good for debundling and defibering treatment. This type of rubbing action normally does not give much cutting. In a beater or conical engine, where the bar surfaces tend to run effectively in a closer proximity to each other, more severe beating and jordaning actions can generally be given.

Pulpers

The other important phase of stock preparation that should be covered now is the defibering or pulping. This we will define as a matter of getting the

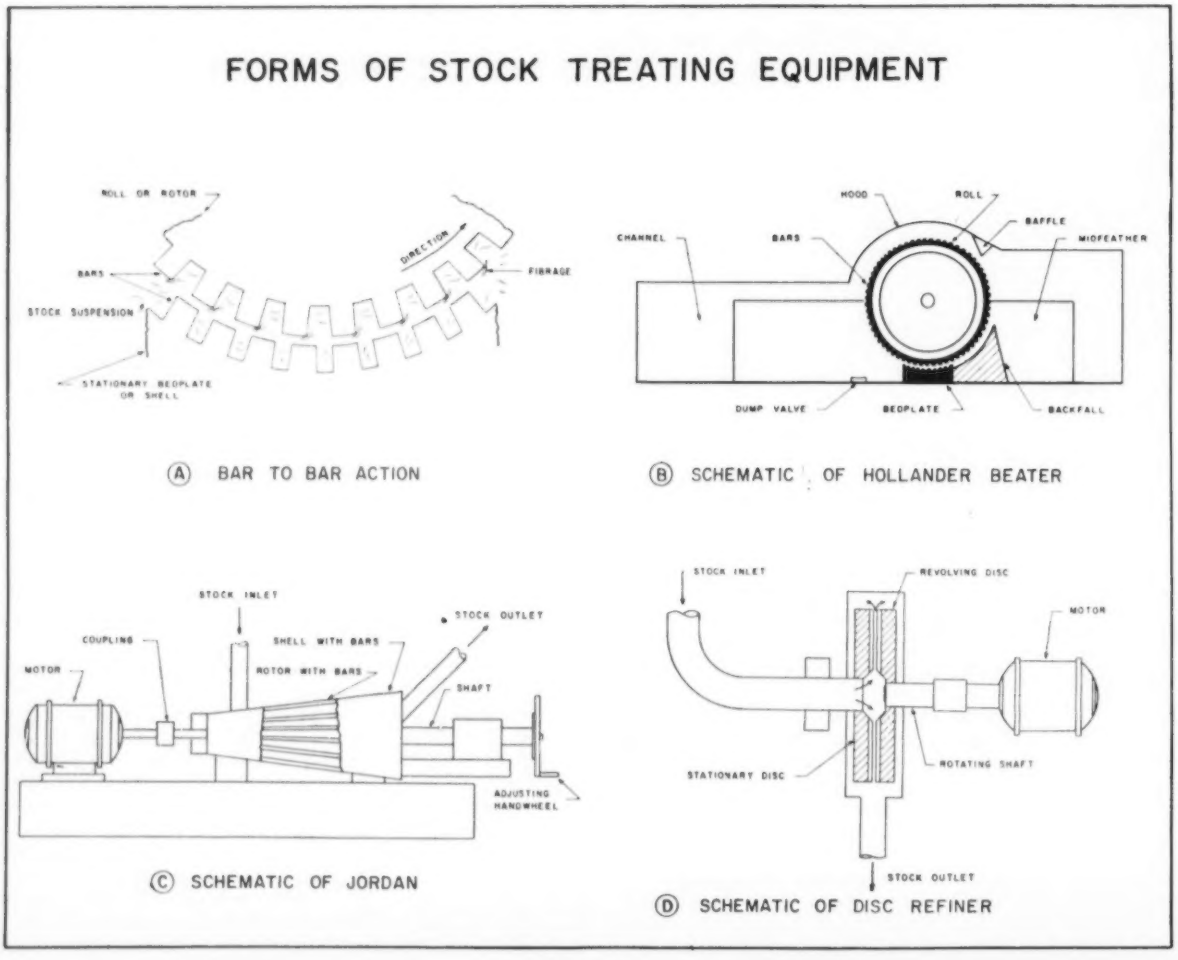


Figure 3

dried pulp or broke back into suspension with water. It is distinct from beating, since beating develops specific properties in the individual fiber. As mentioned earlier, the beater was originally and sometimes still is used for pulping. Later various units were developed to shred or tear apart the charge in a relatively dry state. Recently there have been a number of types of pulpers developed which do the work more efficiently and rapidly and with less labor than the beater or shredder.

One of the disadvantages of using a beater or shredder is that they must be charged slowly, whereas the present day pulper can be charged in one batch. The present day pulper generally consists of a large tub, chest or tank equipped with a motor driven propeller-agitator which circulates the stock about at a high rate of circulation. The turbulence of this rapid circulation tends to break down the charge and separate fiber bundles into uniform suspension.

The relative efficiency of these units depends on the resistance of the stock to breaking. In most of them the average stock reaches a fair degree of defibering with a certain amount of fiber bundles or flakes remaining. Often beating or refining equipment is relied upon to break up these additional bundles or flakes. Of course, when beating or refining equipment is used for this purpose, it cannot at the same time most efficiently or effectively treat the individual fibers. It is therefore desirable to have a pulping unit that will as nearly as possible completely defiber the furnish before introducing it to the beating, refining or jordaning equipment. To assure complete defibering of the furnish in the pulper, types have recently been developed that, in addition to the circulating action, also employ a controlled bar-to-bar brushing for completing the defibering of all flakes and bundles. This further contributes to speed and economy in the pulping and the balance of the stock treatment process.

These descriptions cover the types of stock preparation equipment that are most generally used in the various phases of stock preparation. In addition, there are others—such as Kollergangs—that we still see used in quite a number of mills outside this country, wherein a large stone wheel revolves about a stone bowl which contains the pulp in a relatively dry state. This gives a gentle rubbing and separating action to the fibers and bundles.

Rod mills are also used, wherein a series of rods are tumbled inside a cylinder containing the pulp suspension. These give a gentle bruising action to the fiber.

Other methods have been explored, such as jetting the pulp solution against a target at high velocity. There are other units that have been developed that combine a conical engine followed by a disc-type unit at the discharge of the cone. Again we find machines that have a grooved cylinder upon which ride hydraulically controlled shoes for treating the pulp. Another unit for breaking down the fiber bundles employs two horizontal discs, one of which operates with a gyrating motion. A prolonged soaking of the plup seems to have some effect on its qualities, and even agitation in pumps of well soaked pulp may impart a small degree of treatment.

Comparisons of Equipment

Studying the history of stock preparation down through the years, we find that many, many methods have been explored and tried, and a great many of these have been discarded as not practical for commercial operation. As time goes on, the industry is constantly trying and developing still other ideas. Basically, through the years there have been certain proven instruments whose acceptance and use in a wide variety of paper mills under many different conditions have proven a definite place for them in the stock preparation field. Almost without exception, these units employ the basic bar-to-bar mechanical action on the fiber, but the construction and operation of the various items of equipment seem to give differing end results to the fiber. Each of the accepted pieces of equipment appears to be best suited to a particular field of stock preparation—some for beating, some for cutting, some for particle size reduction. The fact that there is often no sharp dividing line between these various fields, in many cases, contributes to the overlapping of one piece of equipment into various fields. This may lead to considerable confusion as to the particular type of service for which a given piece of equipment is best suited. Some equipment also has a wider range of use than others. In terms of simplification, it is desirable to select a machine that, with the minimum of adjustment, will give the highest degree of a standard type of treatment over the widest range of conditions.

Since the three phases of stock preperation are quite different in their requirements, there is no one machine that will efficiently and economically excel in all three. A machine that is good for breaking up fiber bundles is generally not best suited for brushing the individual fiber, and a machine that is good for brushing the fiber cannot as a rule also most effectively cut the fiber. Hence, in the present day mill you will find that three distinct pieces of equipment are used to best advantage for these three requirements. Since the general trend of stock preparation is to try to maintain the inherent strength in the individual fiber, the beating-type action is at the heart of any stock preparation system. Basically, the cellulose fiber is a short and fragile structure, and we must constantly strive to maintain intact as much of the fiber as possible to obtain the optimum development of strength properties. The beating phase of the treatment does this. Following the beating a certain amount of cutting or jordaning may be required to give all around development.

Systems of Stock Preparation

In looking at the overall picture of stock preparation, using present day equipment, we find that it takes two or three basic forms. These can be divided roughly into batch systems, cycling systems or continuous systems.

At the heart of the batch system is the conventional beater, wherein specific quantities of stock are introduced into the beater, treated for a given period of time and then stored in a chest and later delivered to the paper machine through a control refiner or jordan.

Cycling Systems

The cycling system in many ways resembles the batch system with the beater, in that the cycling chest can be likened to a beater tub. The stock is circulated from the chest through the treating equipment, back into the same chest or another chest, and then repassed through the treating equipment for as many cycles as are necessary to develop the required properties. This is much the same as passing the stock a number of times under the beater roll and around the beater tub. The treated stock is then stored in a chest and after this is put onto the paper machine, as described for the batching system.

Continuous Systems

In the continuous system the stock is pulped and mixed and then is pumped to a supply chest and on through continuous-type treating units, of one or more types (depending on the type of treatments required), and directly to the paper machine.

Inherently, all modern industrial practice is to put production on a continuous basis. Since paper and board machines operate on a continuous basis, it would appear advantageous to put stock preparation on this same basis as much as possible. With some of the present day equipment, this can be done and reflects itself in almost instantaneous control through the whole preparation, forming and drying system. This continuous system tends to simplify the stock preparation in that it eliminates the addiional power required to circulate the stock about the beater tub or through the cycling system, the additional chests

required for such cycling systems, the effecting operating time lost between each series of cycles for dumping and filling, and the control, laboratory facilities and labor to check the amount of treatment given to each batch. Without such control, one is never cerain whether the stock is properly treated until after it has passed out of these chests and has gone to the paper machine. If the stock is overtreated, there is very little that can be done other than run off-quality paper. If it is undertreated, the final control equipment at the machine normally can be readjusted to make up the difference. But there are constant fluctuations in quality, aided by the possible variables of treatment in the batch or cycling system, which the continuous system helps to overcome.

After all, the final results of any stock treatment are gauged by the way the treated furnish forms on he machine wire or cylinder mold and by the final tests on the finished product at the dry end of the paper machine. The closer to the paper machine the entire operation can be controlled, and the quicker satisfactory adjustments can be made to accommodate the machine requirements, the less off-quality paper will be run.

At first glance it might be thought that putting a given amount of stock per day through one treating unit and making a number of passes or cycles would give more treatment to the stock than one slow pass of the same amount through the same unit in the same period of time. As mentioned previously, it has been pretty well proven through the years that a specific amount of horsepower applied to a particular stock-treating unit will give a given amount of treatment to a specified tonnage and type of stock in a given period of time. If, say, 30 tons per day of stock is single-passed through a continuous unit at a rate of 30 tons per day, and each fiber is thus retained within the unit and between the treating elements for the maximum period of time, a certain amount of total treatment will be given. If three cycles are to be made on this same 30 tons per day, the flow rate for each cycle must be increased three times to a rate of 90 tons per day. The stock thus spends only a third as much time between the treating elements on each pass, and gets only a third as much treatment on each pass. At the end of the three passes, the stock still cannot have any more treatment than would have been given by a single pass of 30 tons in the same total period of time.

In conflict with these statements, there are some types of equipment that seem to perform to better advantage when handling a greater volume of stock at the increased flow rate of the cycling system.

Where continuous treatment is used and one machine of a type is not sufficient for the entire treatment, two or more are used in series, just as in batch or cycling systems additional treating equipment would be used for grades or tonnages requiring more treatment.

This raises a question of why series instead of parallel. Parallel is sometimes used, particularly at high flow rate where the throughput capacity of the unit being used will not pass the total volume of stock required. In general, however, it has been found that it is difficult to make certain that the same amount of flow and treatment is being obtained and maintained through each of the parallel machines, due to varying frictional losses in the supply lines and through the equipment. Also, series treatment more nearly duplicates the effect of passing the stock under the beater roll a number of times. Each machine can be adjusted to treat the fiber to the best advantage at its particular stage in its reament through he series, similar to establishing a beating curve in the beater wherein the beater roll is lowered gradually through the beating cycle.

Mixed Furnishes

Another consideration that enters into this whole picture is treating mixed furnishes where the furnish may consist of some hard-treating fibers, such as rag or kraft, mixed with easier treating fibers in the extremes, such as soda or groundwood.

In considering the amount of treatment required by various fibers to develop their maximum properties, these can be ranged down, starting with rag stock, which requires the most, and going on down through unbleached kraft, bleached kraft, unbleached and bleached sulphite, and on into the soda pulps. Each of these pulps varies in the general amount of treatment that it requires and that it can stand. Pulps made by the same cooking and bleaching process but from different sources will also vary.

Chemically cooked pulps are the most receptive to treatment. When you get into the pulps such as groundwood or pulps which have been cooked with little if any chemical treatment, there is very little that any type of treating equipment can do in ecms of developing any additional strength. It is primarily a matter of making sure that all the initial fiber bundles are well defibered.

In treating mixtures of these various pulps, the old beating theory has been to treat the distinctly different fibers separately. For instance, in treating a furnish made up of combinations of rag or kraft, sulphite and groundwood, the practice was to put the rag or kraft in the beater first, beat it for a specified time, then add the sulphite and beat it only through the last part of the cycle and, where groundwood is being used, to mix it in at the end of the cycle. On some of the cycling systems this same thing is accomplished by cycling the harder portions through the treating equipment a number of times and then adding in the other material and cycling it mixed with the previous material, and then adding groundwood at the end of the cycle. In a continuous system this same thing can be accomplished by running the harder portion of the furnish continuously through the major portion of the treating equipment, paralleling the easier portion of the furnish continuously through the balance of the treating equipment, controlling the flow and proportion through each continuous system by level gauges at their discharge into a metering head box where the two or more are mixed. The mixed furnish then can go on continuously through additional treating equipment or directly to the paper machine.

Miscellaneous Considerations

Other considerations that enter into the subject are the variety of bar patterns, arrangements and materials that are available and suggested for certain conditions. With some pieces of equipment, the consistencies that are to be handled through the system play a very definite part. Chemicals that may be added and stock temperatures may affect the results. Each of these variables may have some effect on the character or quality of treatment from a specific item of equipment.

In addition to the items that have been covered for definitely treating the stock, stock preparation equipment consideration also may include such items as chests, agitation of these chests, pumps, stock lines, headbox design, consistency control, various blending, mixing and metering chests or boxes, screens, dirt removal from the stock and devices for controlling the operation of the various items of treatment equipment. The majority of these might be classed as items of auxiliary equipment, and I am not going to attempt to give any detailed description of them. Suffice it to say that as a rule the simpler the whole system can be kept, the more readily controllable will be the results.

From all the foregoing you may better appreciate the many possibilities that must be considered in laying out or improving a stock preparation system. I am certainly not in a position to outline the various equipment suppliers' specific recommendations for installing their equipment, nor how the many variables affect their equipment. By the same token, in my position I feel it is not right to describe by name the details and theories of others' equipment.

(To be continued next week)

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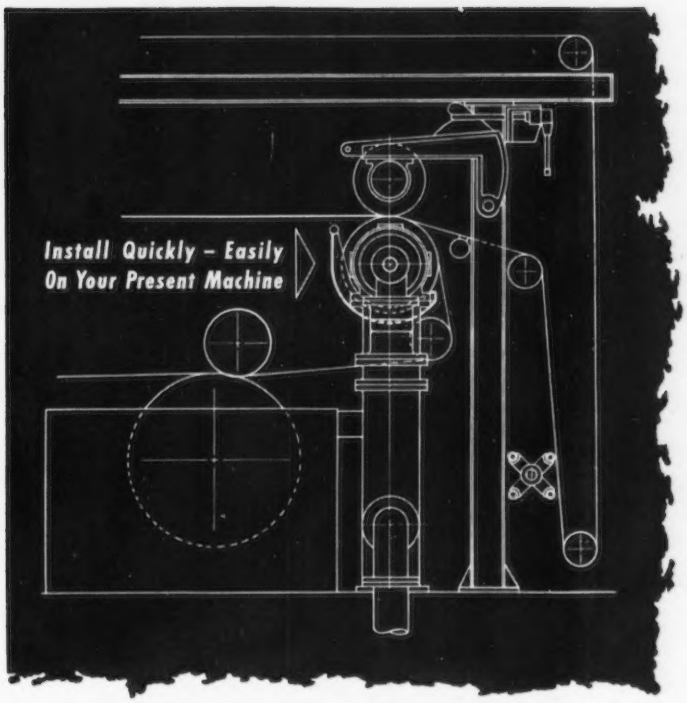
A MANCHESTER SUCTION DRUM ROLL



Schematic drawing of an actual application of a Manchester Suction Drum Roll on a board machine. Note how simple and economical it is to install.

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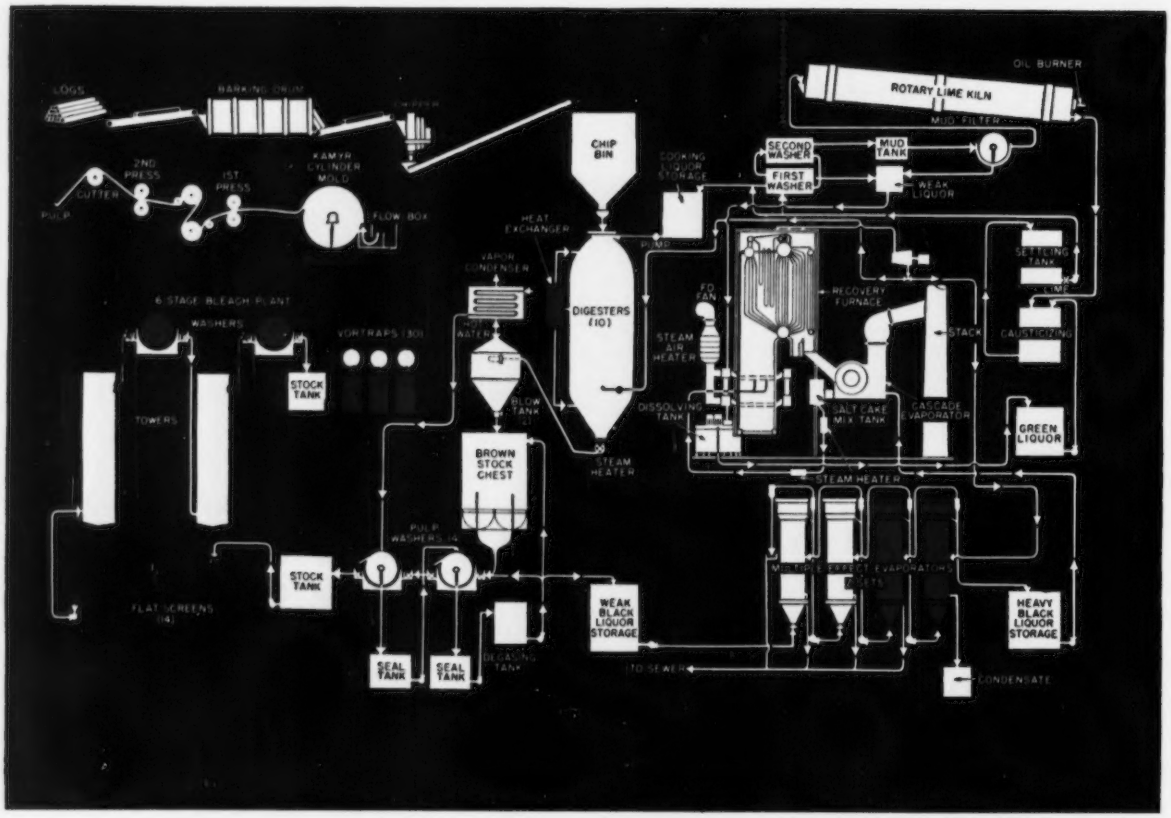
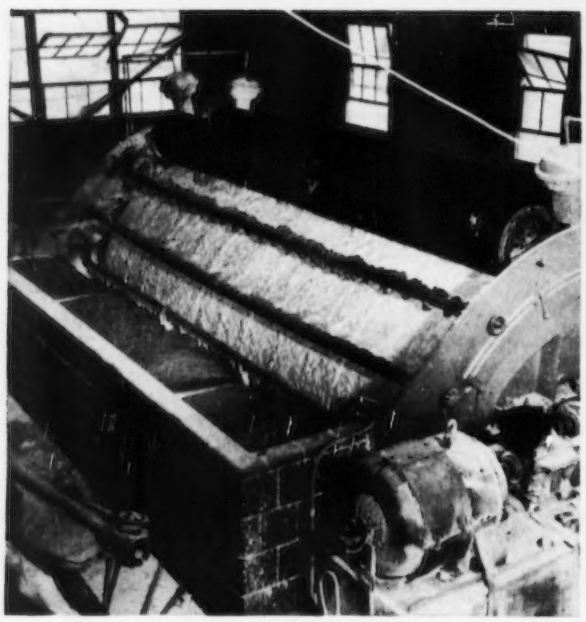
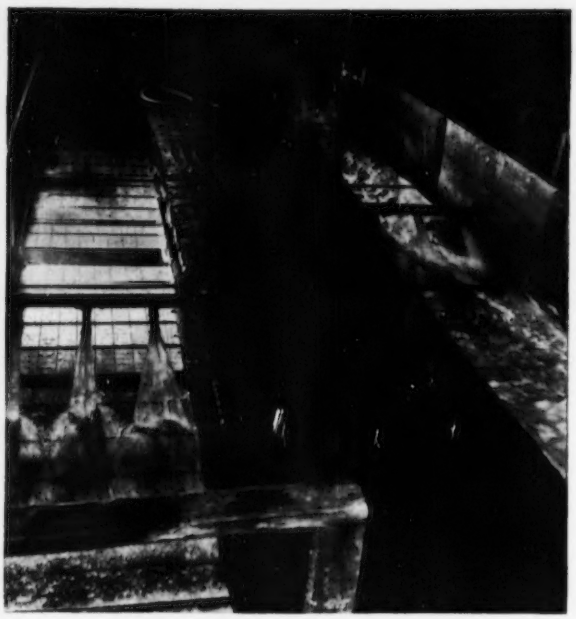




One of six rotary vacuum washers in Brunswick Pulp and Paper Company's bleach plant. Cylinders are faced with 17 x 24 mesh and 10-gage binding wire of Stainless Steel. Washers were manufactured by Improved Paper Machinery Corporation.



Flat screens with Stainless Steel slotted plates sort pulp to uniform size. Fourteen of these screens are in use at the Brunswick plant. They, too, were manufactured by Improved Paper Machinery Corporation.

uses Stainless Steel

to produce 440 tons of white pulp per day

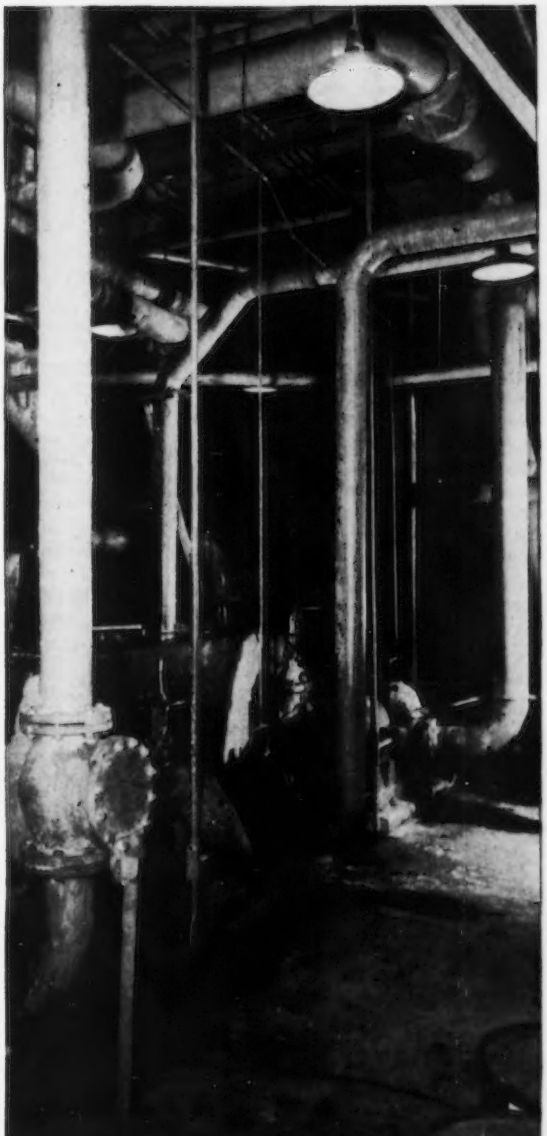
BRUNSWICK PULP AND PAPER COMPANY'S 14-year-old mill at Brunswick, Ga., produces 440 tons of white pulp per day and ships it to plants of its parent companies. Its production facilities are diagrammed on the accompanying flow chart with Stainless Steel equipment indicated in red.

Fourteen flat screens in this mill are Stainless Steel. Each screen consists of three sections containing fourteen 48″ x 12″ x 5/8″ plates. Stainless Steel has been in service here for two years, replacing plates of other material that lasted one year.

In the bleach plant, Stainless cylinder face wires on the six washers have lasted five years under conditions outlined in the table.

In the header and spools on Vortraps feeding the Kamyr cylinder mold, Stainless Steel has demonstrated a service life five times that of other materials. A similar record has been established in the two primaries of the four-effect evaporators.

There are many more places where Stainless Steel can prolong life and eliminate down time. Check your own operation and make plans to specify Stainless wherever it's needed. For finest performance, be sure your equipment manufacturer uses service-tested U·S·S Stainless Steel.



Stainless Steel piping carries pulp from the distributing box to one of the two pulp machines in the mill of the Brunswick Pulp and Paper Company, Brunswick, Ga.

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UNITED STATES STEEL

HENRY C. CRANDALL

Technical Director, Mosinee Paper Mill Co. Outlines . . . .

Wood Storage Problems in the Pulp and Paper Industry

In his introduction, Mr. Crandall pointed out that wood is the most vital and costly raw material used in the various pulping processes. Before going on to discuss details of wood storage problems he stressed the importance of the problem and the necessity for the pulp mills to protect their investment in stock wood. Mr. Crandall then presented the following data and information on the subject, which we present in his own words.

Causes of Deterioration

Fungi and insects are the principal enemies of the wood-pile. Practically every bolt carries with it the seeds of its own destruction, since some spores or slight fungus growth are almost certain to be present. These fungi are of two general types: the white rots, which are lignin and cellulose consuming, and the brown rots, which primarily are cellulose-destroyers. Richards *(1)* gives an excellent discussion of the various species of fungi involved in pulpwood decay. Their growth is favored by definite moisture and temperature conditions, such as in rough wood during summer storage. At moisture percentages below 23 percent or above 55 percent fungus, growth is practically static; consequently, the storage of wood in the peeled condition so as to permit rapid drying, will do much to prevent deterioration. Similarly, wood completely immersed in water is almost immune to decay, although this is impractical for most mills.

TABLE 1

Date Pulped	Age of Wood	$KMnO_4$ No.	Screened Yield
September, 1947	1 month	20.9	46.6%
June-July, 1948	10 months	22.1	41.5%
December, 1948	16 months	20.3	39.4%

Deterioration of wood in the yard occurs relatively rapidly during the summer, and is almost nil during the winter in the Lake States area. Weather conditions are a considerable factor in rate of deterioration, a hot, dry summer producing less deterioration than warm, damp conditions. Here again, peeled wood fares much better than rough wood, since the bark tends to hold moisture in the bolt. The possibility of barking the pulpwood bolts in the woods as they are cut has received considerable attention recently, and the availability of portable barking equipment makes this idea worth considering from the wood conservation and transportation angles. The economics of on-the-spot barking are somewhat dubious as yet, since most mills have their own barking equipment, and barking pulpwood in the woods in cold weather is probably not the easiest job. However, the idea has its merits, and the equipment manufacturers are working on the problem.

The action of insects on pulpwood occurs primarily at the cambium layer, between the bark and the wood. The principal effect here is loss of wood substance around the perimeter of the solid wood area. This damage is generally not as severe as that inflicted by fungus action, since the quality of the wood in the rest of the bolt is not affected.

Loss from Deteriorated Wood

The effects of using old and deteriorated wood in the pulp mill provide us with the really sad part of the story. In sulphite pulping, a certain amount of ageing of the wood is customary, since it loosens the bark and reduces pitch trouble on the paper machine. However, Pascoe and Scheffer *(2)* state that sulphite pulp is more seriously affected by decay in the wood than kraft pulp. As pointed out previously, the principal physical effect of fungus action on wood is the decrease in wood density, with accompanying loss of pulp yield per cord. This effect is shown in *Table I* and in *Figure 1*,

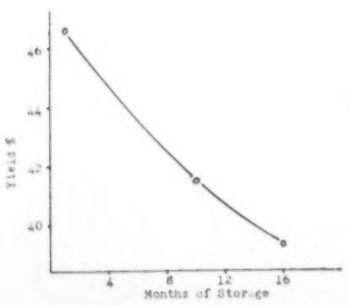


Figure 1.—Decrease in yield of Jackpine pulp from stored wood.

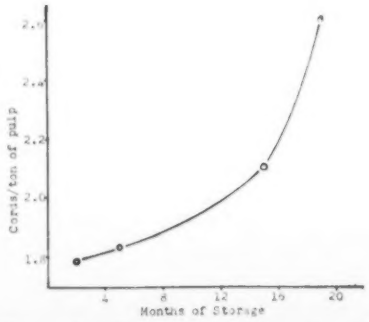


Figure 2.—Cords required per ton of pulp using stored wood.

Summary of a paper on this subject presented at the meeting of the Forest Products Research Society, Upper Mississippi Valley Section, at Wausau, Wis.

which show the decrease in yield from a test pile of green jackpine, cut in August 1947 and stored in the Mosinee Paper Mills Company woodyard for 16 months. It was pulped at stated intervals under standard conditions in the Mosinee Research Department experimental pulping unit.

In a similar test made in 1951-1952, a test pile of rough jackpine was stored under yard conditions at the Mosinee mill, and the yield results calculated as cords of wood required per ton of pulp. The results are shown in *Figure 2*. This shows that after 15 months of storage, it required 18 percent more wood to produce the same amount of pulp that was obtained at 2 months storage. In other words, the additional 13 months storage increased the cost of wood to the mill by 18 percent. Experimental cooks and TAPPI Standard beater strength tests were made on these pulps; *Figure 3* showing the Mullen vs. Tear curves for the 2-month, 5-month, 15-month and 19-month pulpings.

In 1947-1949, a cooperative study of wood deterioration on a commercial scale was made by four northern kraft mills, of which Mosinee was one, in conjunction with Forest Products Laboratory. Pulp made from wood at various storage times was made into a standard grade of paper on the paper machine, which showed a 13 percent loss in mullen and a 9 percent loss in tear between the first pulping at 7 months storage and the second pulping at 11 months storage.

Sound Wood Yard Storage Practices

1. Use your wood as soon as possible after cutting.
2. Store wood in the peeled condition if practicable.
3. Have the woodyard well drained, clean up rubbish and bark accumulations, and surface it with cinders.
4. Pile the wood in tiers, off the ground if possible, with the piles running in the direction of prevailing winds for good air circulation.
5. Use the wood systematically and in rotation according to length of storage.
6. Never store new wood on an old pile, but clean up the old pile completely, including bark and rubbish, before starting a fresh pile.

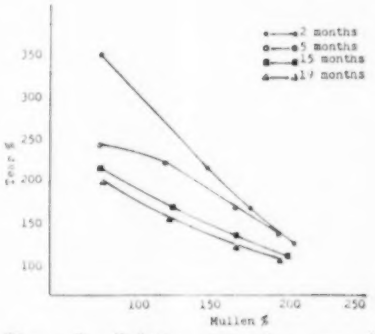


Figure 3.—Relative strength curves of pulps from stored wood.

The question naturally arises as to what can be done by the individual mill to prevent or reduce to a minimum these losses in pulp yield and strength, which are certainly translatable into dollars and cents loss to the pulp mill. There is no new panacea for the prevention of wood deterioration, but practicing the principles of good woodyard practice will help materially.

The availability of wood in this country is not such that we can afford to waste it. Plenty of evidence is available from the literature and the personal experiences of pulp and paper mill men to show that wood deterioration exacts penalties in cash and quality from the pulp producer. It should be apparent that the study and practice of proper wood utilization methods will pay good dividends, and benefit all of us who are dependent on the tree and its products for our daily living.

References

1. Richards, C. Audrey, U. S. Forest Products Laboratory Reprint R995.
2. Pascoe, T. S., and Scheffer, Theodore C., *Paper Trade Journal 131*, No. 2, 16-21 (July 13, 1950).

NEWS OF ASSOCIATIONS

TAPPI Coating Conference Program

The Fourth TAPPI Coating Conference will be held at the Netherland Plaza Hotel, Cincinnati, Ohio, on May 25-27, 1953.

May 25

Symposium on Coated Papers in Offset Printing.

"Coated Paper and Offset Printing," by A. P. Reynolds and F. H. Frost, S. D. Warren Co.

"Offset Inks for Coated Papers," by F. J. Dankert, Sun Chemical Co.

"Offset Printing of Coated Papers," by C. F. King, U. S. Printing & Lithograph Co.

"Non-Paper Factors and Quality of Offset Paper," by D. W. S. Riddell, Montreal Lithographing Co.

"Operating Factors in Offset Printing on Coated Papers," by R. F. Reed, Lithographic Technical Foundation.

Panel Discussion on "Factors Involved in Offset Printing on Coated Paper," A. C. Zettlemoyer, National Printing Ink Research Institute, Moderator.

May 26

Symposium on Coated Board.

Talks and Panel Discussion led by J. T. Loomer, Robert Gair Co.

Papers to be presented by: Harry C. Fisher, Gardner Board & Carton Co.; Glenn Renegar, Container Corp. of America; and Osborn Curtis, Lord Baltimore Press.

May 27

"Considerations in the Design of a Universal Coating Machine for Paper and Board," by R. J. Jacobs, Dilts Machine Works.

"Physical Properties of Size-Pressed Coated Paper Containing Dow-Latex 513-K," by Lloyd Silvernail, Dow Chemical Co.

"An Approach to the Evaluation of Coated Paper Smoothness," by L. J. Scheid and Arthur Hupp, Watervliet Paper Co.

Plant Visits

Arrangements have been made to have tours of the plants of the following companies: Gardner Board & Carton, Co., Middletown, Ohio; U. S. Printing and Lithograph Co., Cincinnati, Ohio; and Mead Corporation, Chillicothe, Ohio.

Theobald Accepts Temporary Post as Sec.-Treas. of Linter Assn.

C. E. Theobald, Jr., of Memphis, Tenn., has been named secretary-treasurer of the American Cotton Linter

THIS STORY MAY SAVE YOU

Thousands of Dollars

Research Corporation Offers

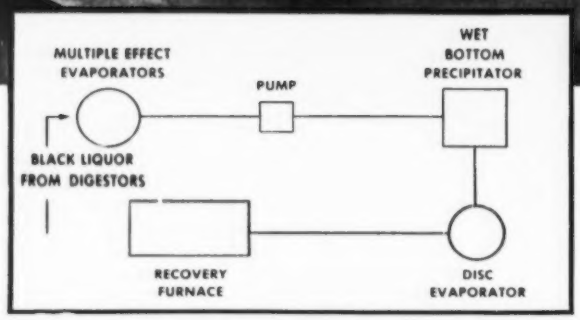
WET RECOVERY SYSTEM

for Electrical Precipitators

A shortcut in the recovery of chemical compounds from Recovery Furnace Stack Gas offered by Research Corporation, assures an appreciable saving in operating and maintenance cost. That's because the new Wet Recovery System gets the precipitated dust into the black liquor as soon as possible after it has been removed from the gas.

Instead of collecting dust in hoppers at the bottom of the precipitator and conveying it, in the dry state, to black liquor tanks, the new method utilizes a liquor sump or tank directly under and an integral part of the Cottrell Precipitator. Black liquor flows to this wet bottom where the recovered dust is taken up in solution or suspension. In this continuous process, the black liquor discharges to the feed going to the disc evaporators.

The Wet Recovery System does away with handling dust in the dry state. It eliminates steam coils and heat insulation formerly needed to prevent condensation in the hoppers. It obsoletes such expensive equipment as hopper vibrators and steam-jacketed conveyors.



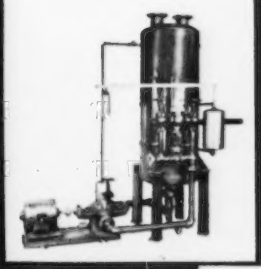
COMMERCIAL installations have proved the economy of this new system. They have demonstrated, too, that dust collection efficiency remains as high with the wet recovery system. For complete data, write for Editorial Reprint P-1.

RESEARCH CORPORATION

405 Lexington Ave., New York 17, N. Y.
122 South Michigan Avenue, Chicago 3, Illinois
Bound Brook, New Jersey

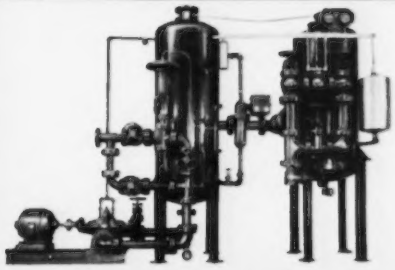
RC-132

small



For small machines

medium



For average sized machines

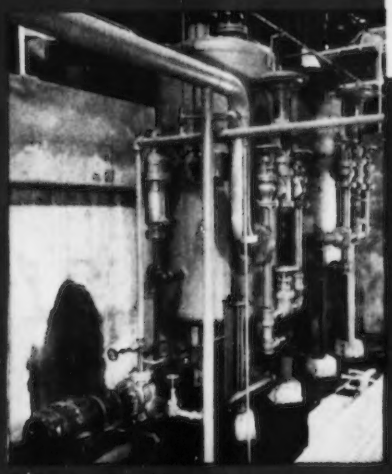
10% to 30% production increase.

Positive reduction in steam costs—even with tonnage gains.

Improved quality. Uniform drying.

Less cockle or curl.

Moisture content control. No over-drying.



On big board machine

and large

they all need fulton systems

Today practically all of our large paper machines are 100% Fulton dryer drainage equipped—a great majority of the medium size machines have Fulton Systems and the smaller and older machines are fast installing Fulton Systems. As a matter of fact, Fulton Dryer Drainage is being specified by all of today's paper machine builders.

Compared to the potential increase in dryer speed and tonnage gain—the quality step-up—the steam economy—the modest initial cost of Fulton equipment is literally insignificant. It should, therefore, surprise no one that Midwest is able to tally the installation of 1000 Fulton Systems—in new mills, old mills, large mills, small mills.

Get technical bulletin . . . Check with user mills . . . Have us survey and estimate cost.

THE MIDWEST FULTON MACHINE CO. • DAYTON, OHIO

Superintendents Meeting Dates

DATE	DIVISION	PLACE
May 8-9	Northwestern	Del View Hotel Lake Delton, Wis.
May 15	Connecticut Valley	Roger Smith Hotel Holyoke, Mass.
May 15-16	Pennsylvania-New Jersey-Delaware	Stacy-Trent Hotel Trenton, N. J.
May 21	Michigan	Hotel Harris Kalamazoo, Mich.
May 22-23	Pacific Coast Joint Meeting With TAPPI	Gearhart Hotel, Gearhart, Ore.
June 5	Miami Valley Division Central District	Orr Felt & Blanket Co. Spring Jamboree Piqua, Ohio
June 9-11	National	Atlanta-Biltmore Hotel Atlanta, Ga.
Sept. 11-12	Northwestern	Hotel Wausau Wausau, Wis.
Sept. 17-19	New York-Canadian	The Alpine Inn St. Marguerite, Que.
Sept. 17-19	Northeastern	Poland Spring House Poland Spring, Maine
October 28-30	Southern and Southeastern (Joint Meeting)	Edgewater Gulf Hotel Edgewater Park Mississippi

TAPPI Meeting Dates

DATE	SECTION	PLACE
May 1	Central District Empire State	University Club, 431 E. Fayette St., Syracuse, N. Y.
May 7	Kalamazoo Valley	Hotel Harris Kalamazoo, Mich.
May 12	Empire State Metropolitan District Ladies Night	Fraunces Tavern New York, N. Y.
May 14	Ohio	To be announced
May 14	Empire State Northern District	Hotel Woodruff Watertown, N. Y.
May 15	Lake Erie	Carter Hotel Cleveland, Ohio
May 19	Lakes States	Hartwell Country Club Cincinnati, Ohio
May 21	Empire State Eastern District	Milfranks Restaurant Glens Falls, N. Y.
May 21-23	Joint TAPPI- Superintendents Meeting, Pacific Section	Gearhart Hotel, Gearhart, Ore.
May 28	Delaware Valley	Engineers Club 1317 Spruce St., Philadelphia, Pa.
June 8-10	Empire State Annual Meeting	White Face Inn Lake Placid, N. Y.
June 19 and 20	New England and Maine-New Hampshire	Poland Spring House Poland Spring, Maine

Assn., to serve until the election of officers at the annual meeting in Chicago in November 1953.

Mr. Theobald has stated that under no circumstances or conditions would he accept either nomination or election to this office after the November meeting.

A permanent replacement for Arthur Mosby, who served in this office from the date of the organization of the association until his passing on March 13, is sought.

Penjerdel Superintendents Announce Spring Meet Program

A special Spring meeting of the Pennsylvania-New Jersey-Delaware Div., APPMSA, is scheduled for May 15-16 at Hotel Stacy-Trent, Trenton, N. J.

Among the papers to be presented are:

"Unusual Continuous Fibre Preparation," by Karl Dammann, Robert D. Robinson, and Grant D. Muschlitz, supt. of maintenance, asst. paper mill supt., and asst. plant engineer, respectively of Paterson Parchment Paper Co., Bristol, Pa.

"Considerations In Choosing Control Chart Limits," by George R. Shaw, supervisor, Vulcanized Fibre and Paper Mill, Taylor Fibre Co., Betzwood, Pa.

"Development of Specialty Papers," by William E. Anderson, research engineer, Riegel Paper Corp., Milford, N. J.

Howard Street, National Vulcanized Fibre Co., Yorklyn, Del., third vice-president of the Superintendents Association, as chairman in charge of mill visitation, has arranged for a trip through the mill of Paterson Parchment Paper Co. The trip is scheduled for Friday p.m., May 15.

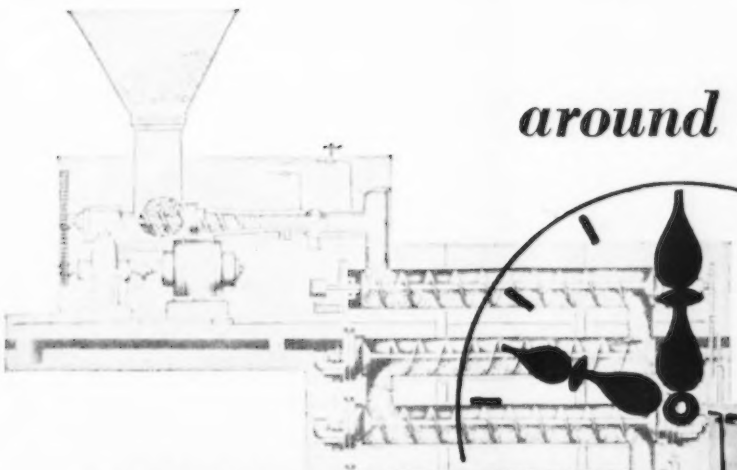
Following the mill visit, the visitors are invited to the Trenton Country Club where a "Get-Together Party" and dinner will be enjoyed. Alan Boyd, F. C. Huyck & Sons, is in charge of entertainment.

L. M. Sutherland, Sutherland Refiner Corp., is in charge of the golf tournament and putting contests for both men and women. The golfing activities will take place at the Trenton Country Club.

Mrs. George M. Suydam, in charge of the program for the ladies, has arranged for the women to visit Lenox China, Inc., on Friday morning, May 15. The women will be taken there by bus; and, while there, they will be given a tour of the famous showrooms and also will see how fine china is made.

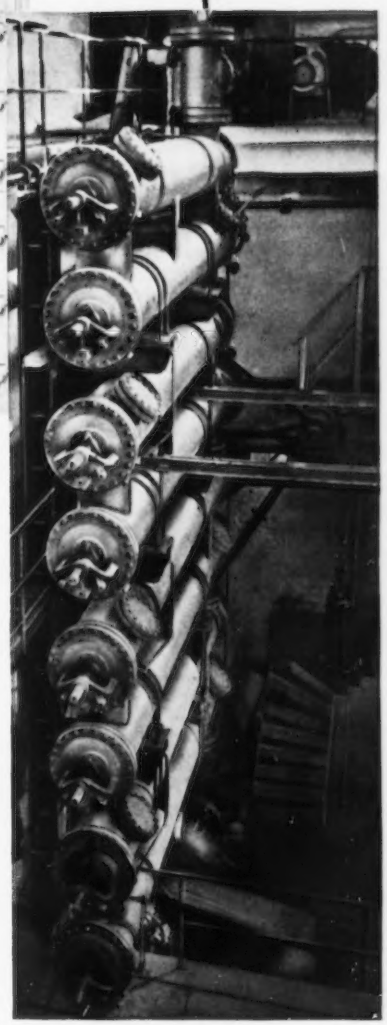
(Continued on page 50)

around the clock



CHEMI-PULPER®

continuous digester



More and more mills using CHEMI-PULPER continuous digesters for their around-the-clock pulp mill operation report the continuous production of uniform, high grade pulp at the lowest possible cost.

CHEMI-PULPER continuous digesters have been built in sizes from 2 to 8 tubes with various diameters. The largest of these units are capable of producing over a 100 tons of pulp per day. Some are equipped with the new Pandia Discharger which continuously and uniformly discharges pulp at a constant rate from the CHEMI-PULPER continuous digester to the atmosphere.

The 8-tube CHEMI-PULPER continuous digester shown here is an installation in Finland which was placed in operation during the Summer of 1951 and feeds primarily on waste spruce and pine from a sawmill. This unit is fabricated of 316 stainless steel which permits the use of alkaline or acid cooking liquors. Because of the CHEMI-PULPER continuous digester's basic construction and flexibility of operation, the 8-tube unit can produce pulps over a wide yield range.

CHEMI-PULPER continuous digesters are being used universally to convert hard or soft woods or mixtures of these woods into superior pulps for insulating board, flooring, roofing and automotive felts, and .009 corrugating and other types of boards and papers.

One of Pandia's engineers will be glad to consult with you concerning plans for new plant construction or for improving present pulp mill operation.

Write for Bulletin C2.

Manufactured and Sold in Canada by
THE ALEXANDER FLECK LIMITED, OTTAWA, CANADA.

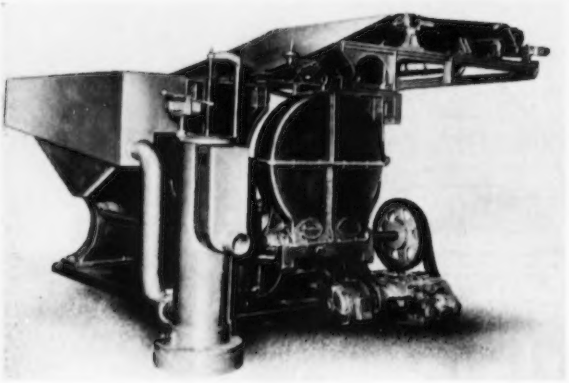
PANDIA

PANDIA INC.

122 EAST 42nd STREET • NEW YORK 17, N. Y.

NEW EQUIPMENT AND SUPPLIES

Two French Machines for American Mills

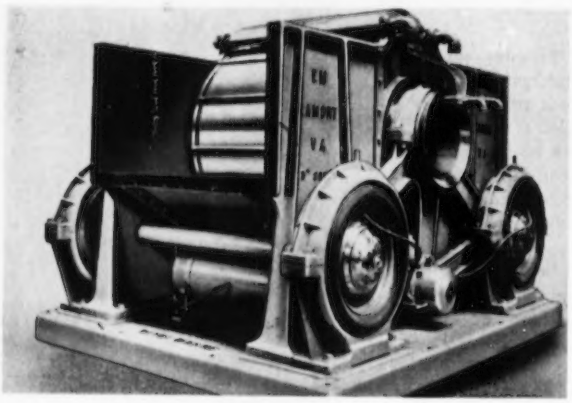


Stock Filter

E. D. Jones & Sons Co., Pittsfield, Mass., announces completed arrangements to manufacture and distribute in North America the Jones Lamort Cellular Filter under patent of E. & M. Lamort Sons of Vitry-Le Francois, France. It is stated that the filter, and the screen which is described below, will both be adapted to the paper mill requirements of the North American industry.

The filter is recommended for use with white water, raw water, or pulp thickening operations. According to report, the special features of this unit are its ability to maintain constant efficiency under normal loads or surges, its small space requirements, and its high density recovery (five to ten percent as required) of stock from white water.

No chemicals are required for operation of the filter, its action being strictly mechanical and automatic. It is also said to offer good wire life.

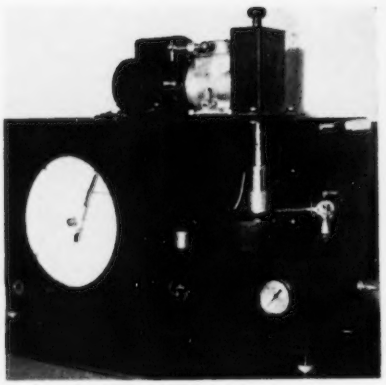


Stock Screen

On same basis as the above filter, the Jones Lamort Vibrant Screen will also be manufactured and distributed by E. D. Jones & Sons Co. This high-frequency screen, based on principles familiar in some North American units, is said to offer additional features.

It incorporates a simple mechanism for shock absorption declared to eliminate vibration on vat and foundation. No vibrating elements pass through the stock. According to the manufacturer's report, the screen is also designed for simple adjustment of the intensity of stroke without complete dismantling of the unit. For cleaning inside and out, the screen can be taken apart in sub-assemblies in less than 60 minutes.

Drum size is about 40 in. x 40 in. Drum speeds vary from ½ to 3½ r.p.m., and vibration is scaled at about 1430 per minute. Horsepower is about seven. First American versions of filter and screen are expected to be completed before the end of this year.



High Shear Viscometer

Calgon, Inc., 323 Fourth Ave., Pittsburgh, Pa., has announced in an article by R. N. Thompson the details of a new principle in the design of high shear viscometers. The result of this design is the Hagan Viscometer, developed for use in the paper industry and featuring the measurement and recording of the shearing force in terms of torque.

The unit consists of a variable speed transmission and motor, a stationary sample cup and driven bob, and a recording Hagan Ring Balance Meter for recording the torque caused by the viscous drag of the sample and the corresponding rate of shear. In basic principle, the device measures a force by the automatic application of a balancing force set up by a pneumatic pressure imposed upon a known area. The measurement of this pneumatic pressure then becomes an accurate measure of the applied force.

The torque measuring device is supplied with air under constant pressure and is mechanically coupled to the sample cup of the viscometer. The output pressure (balancing force) of the torque measuring device is linearly proportional to the torque (applied force) developed on the sample cup due to the viscous drag of the test material. This output air pressure is recorded by the ring balance meter which also records the rate of shear. By means of check weights the output air pressure may be calibrated in terms of torque in dynecentimeters. The range of the torque measuring device may be varied over a tenfold range by simple adjustment of the mechanical coupling to the sample cup. The method of changing the range of the instrument is said to be simple and does not involve the disassembly or substitution of instrument components. It is substantially free from mechanical hysteresis. Its operation is linear and extremely sensitive. The calibration can be verified at any time.

The radial movement of the pen on

(Continued on page 49)

MOVING TOWARD NEW SOLUTIONS*

Working out new and varied solutions to old problems

is a fundamental part of Niagara's service to industry

NIALK® Liquid Chlorine

Delivered in Niagara's modern, scrupulously clean tank cars, NIALK Liquid Chlorine is used throughout the paper industry in the development and application of new, more effective bleaching methods.

Backed by constant research, produced with the strictest attention to quality control, this NIALK product—like every NIALK product—meets industry's most exacting specifications.

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* NIALK LIQUID CHLORINE NIALK CAUSTIC POTASH

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NIALK CAUSTIC SODA NIALK TRICHLORethylene

NIAGATHAL (TETRACHLORO PHTHALIC ANHYDRIDE)

PRICES

MARKET WOOD PULP

Second Quarter Contract Prices, Per Short Air-Dry Ton

Delivered Basis — Varying Freight Allowances

	U. S.	Canadian	Swedish	Finnish	Norwegian
Groundwood	$85.00/ 87.50†	‡$60.00/ 90.00	$75.00/ 80.00§	$75.00/ — §	$75.00/ 80.00§
Sulfate, Bleached	140.00/147.50	145.00/155.00	137.50/142.50§		
Semi-bleached Sulfate	135.00/140.00		§127.50/130.00		
Sulfate, Unbl.	95.00/125.00	100.00/125.00	100.00/105.00*	105.00/135.00*	
Sulfite, Blchd.	140.00/ —	145.00/ —	§130.00/135.00	140.00/ — *	140.00/145.00*
Sulfite, Unblchd.	125.00/130.00	130.00/ —	§110.00/ —	120.00/125.00*	
Sulfite, Unbl'd (glassine)	127.00/ —	134.00/ —	§115.00/ —		
Soda, Blchd.	140.00/ —	140.00/ —			
Stand. News, Sideruns	92.50/ —	80.00/ 85.00			

† Midwestern Markets. ‡ F.o.b. Shipping Point. § On Dock Atlantic Ports * Freight allowed.

RAG MARKET

New Domestic Cotton Cuttings

Delivered Mill Basis

	Per 100 lbs
No. 1 White Shirts	$14.00/$14.50
No. 1 Unblchd. Muslins	15.50/ 16.00
Blchd. & Unblchd. Underwears	15.50/ 16.00
Blchd. Canton Flannels	13.50/ 14.00
No. 1 Light Silesias	9.50/ 10.00
No. 1 Light Prints	7.00/ 7.25
No. 1 Blue Overalls	9.00/ 9.50
Suntan Khakis	nominal
Fancy Shirts	6.50/ 6.75
Mixed Khakis	4.75/ 5.00
Cottonades	4.50/ 4.75
No. 1 Washables	4.00/ 4.25

Old Domestic Cotton Rags

(Prices to Dealers, F.o.b. Ship. Pt.)

	Per 100 lbs.
Mixed White	$3.50/$4.00
Cotton Pants & Overalls	2.75/ 3.00
Thirds and Blues, Repacked	2.00/ 2.25
No. 1 Roofing Rags	1.00/ 1.05
No. 2 Roofing Rags	.90/ .95

COTTON LINTERS

Memphis Market

F.o.b. Oilmills

	Apr. 14 Per 100 lbs.
Grade 1 n.a.	
2	$13.50/ 12.00
3 1st cut—felting	11.50/ 10.00
4	9.00/ 7.00
5	6.50/ 5.50
6 * 2nd cut—chemical	5.00/ 5.00
7 *	5.00/ 5.00

* Based on 73% cellulose.

Bagging

(Prices to Dealers, F.o.b. N. Y.)

	Per 100 lbs.
Foreign Gunny	$4.75/$5.00
Heavy Wool Tares	4.75/ 5.00
Foreign Scrap Burlap	3.75/ 4.00
Austr. Wool Pouches	5.50/ 6.00
Domestic Manila Rope	6.50/ 7.00
No. 1 Sisal Strongs	5.00/ 5.25

WASTE PAPER MARKET

Prices to mills, per ton, f.o.b. cars shipping point (includes brokers' fee.) These quotations are a partial indication of the price range on volume tonnage in each market on the date specified, as gathered from major dealers. SPECIAL PACKINGS AND SPOT TONNAGE NOT INCLUDED. Prices nominal. See TRENDS.

	N.Y.-Phila. April 20	Boston April 17	Chicago April 3	Los Angeles April 9
No. 1 Mixed Paper	$9.00/ 10.00	$9.00/ 10.00	$8.00/ —	$15.00/ —
No. 1 News	15.00/ 16.00	15.00/ 16.00	17.00/ —	17.00/ —
Overissue News	21.00/ 23.00	15.00/ 21.00	— / —	— / —
Mill Wrappers	14.00/ 15.00	12.00/ 15.00	11.00/ —	14.00/ —
Old Corrugated	21.00/ 22.00	19.50/ 20.00	20.00/ —	21.00/ —
Double Kraft Ld. Corr. Cuts	35.00/ 45.00	35.00/ 45.00	40.00/ 45.00	30.00/ 40.00
100% Kraft Corr. Cuts	45.00/ 55.00	45.00/ 55.00	60.00/ —	45.00/ —
No. 1 Brown Kraft	35.00/ 40.00	— / —	30.00/ —	— / —
Triple Sorted Brown Kraft	37.50/ 42.50	36.50/ 40.00	— / —	45.00/ —
New Br. Kraft Env. Cuts	65.00/ 75.00	60.00/ 70.00	60.00/ —	50.00/ —
New Br. Kraft Bag Cuts	55.00/ 60.00	55.00/ 60.00	65.00/ —	40.00/ —
No. 1 Gdwd. Shvs.	20.00/ 30.00	25.00/ 35.00	27.00/ —	27.00/ —
White Newsblanks	55.00/ 70.00	50.00/ 65.00	45.00/ —	60.00/ —
No. 1 Soft Wht. Shvs.	60.00/ 65.00	65.00/ 75.00	55.00/ —	— / —
Hd. Wht. Shvs.	90.00/ 95.00	80.00/ 95.00	85.00/ —	100.00/ —
Hd. Wht. Env. Cuts	115.00/125.00	105.00/120.00	100.00/ —	110.00/ —
Col. Tab. Cards	50.00/ 60.00	40.00/ 50.00	40.00/ —	24.00/ —
Manila Tab. Cards	70.00/ 75.00	70.00/ 80.00	70.00/ —	50.00/ —
Mixed Ledger	40.00/ 45.00	38.00/ 45.00	45.00/ —	24.00/ —
White Ledger	55.00/ 65.00	50.00/ 60.00	60.00/ —	45.00/ —
No. 1 Book & Mag.†	16.00/ 18.00	12.00/ 16.00	15.00/ —	— / —
No. 1 Rep'd. Hvy. Books‡	25.00/ 35.00	27.00/ 40.00	27.50 —	— / —

† Includes Time & Life; no coarse groundwood. ‡ Not to exceed 10% groundwood. § Deld.

MATERIALS

Aluminum sulfate:		
cml. bags, wks. cwt.	1.65	
iron-free, c.l. cwt.	3.25	
Casein, acid prec.:		
dom. sh. pt. c.l. lb.	.28	/ .38
imp. ex. dock lb.	.16½	/ .23
Caustic soda:		
c.l. wks. solid, 76% cwt.	3.35	
flak. & grd. 400-lb. drums	3.75	
liquid 50% tanks	2.55	
liquid 70% tanks	2.65	
China clay:		
dom. air-float, c.l. wks. ton	10.00	
water-washed, lump, filler. ton	11.00	
coating ton	17.60	/30.50
imported, ex. whse. short ton	16.00	/29.50
Chlorine:		
single-unit tanks, works. cwt.	2.70	
multi-unit cwt.	3.20	/ 4.40
Formaldehyde:		
USP, imh. dms. c.l. wks. lb.	.0666/	—
l.c.l., E. wks.	.071 /	—
Fuel oil:		
Bunker C, No. 6 hvy. tanks, N.Y. harbor bbl.	2.10	/ 2.13
Lime:		
hydrated bags, wks. tons	14.50	/15.50
Gum rosin:		
K, M, N drms, c.l. Savan cwt.	7.34	/ 7.45
Rosin size:		
70%, gum & pale grds., tank cars, south, sh. pt. cwt.	6.50	/ 6.60
Salt cake:		
dom. bulk, c.l. wks. ton	17.00	
wks. frt. all. ton	20.00	/22.00
Soda ash:		
light, 58%, bags, wks	1.65	
bulk cwt.	1.35	
Sodium silicate, 40° Be.:		
tank-cars, wks. cwt.	.90	/ —
drums, wks. cwt.	1.25	/ 1.80
42° Be. WW. tank-cars, wks. cwt.	1.45	/ —
drms, wks. cwt.	1.80	/ 2.35
Sodium peroxide:		
dms. c.l. E. of Miss. lb.	.186	
l.c.l. do. lb.	.196	/ —
Soybean, protein:		
chem. isol, wks., c.l., bags. lb.	.23½	/ .24¼
Sulphuric acid:		
60° Be. cbys. c.l. wks. cwt.	1.75	/ —
l.c.l. wks. cwt.	2.05	/ 2.85
tankcars, wks.	16.30	/ —
Sulphur:		
crude, c.l. mines, contract, long ton	25.50	/27.50
f.o.b. vessels Gulf	30.00	/30.50
Sulphur dioxide:		
liquid, coml. cyl. wks. lb.	.09	
multi-unit cars lb.	.0535	
Starches:		
pearl corn, bags, c.l. prod. plant	6.39	/ —
white, dextrines, c.l. do. cwt.	7.78	/ —
potato, Idaho, c.l. wks. cwt.	8.50	/ —
potato, Maine, f.o.b. wks. cwt.	6.85	/ 7.35
potato, imported O.D. bags	7.75	/ 8.65
Talc:		
domestic, sacks, c.l. wks. ton	25.00	/30.00
Titanium dioxide:		
anastase, c.l. deld., bags. lb.	.21	/ .21½
l.c.l. deld. lb.	.22	/ .22½
rutile, c.l. deld. lb.	.23	/ .23½
l.c.l. deld. lb.	.24	/ .24¼

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ROTARY SCREENS

FINE SCREENS

PERFORATED METALS
ALL TYPES

RADIAL KNOTTERS

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FOR
GROUNDWOOD – SULPHITE
PULP & PAPER MILLS

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CENTRIFUGAL SCREENS

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—ALSO—

THE FOLLOWING PERFORATED PARTS, IN FINISHED OR SEMI-FINISHED FORM

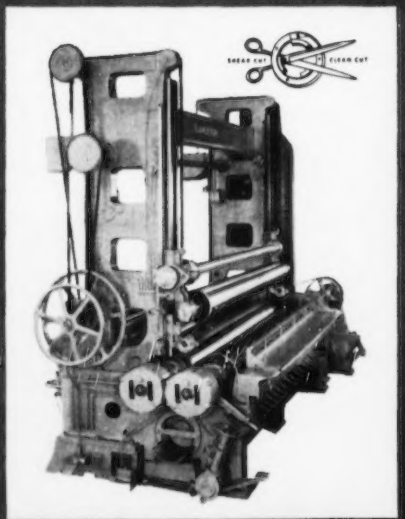
EXTRACTOR PLATES
DIGESTER SCREENS
DRAINER BOTTOMS
PULP WASHERS
PADDLE SCREENS
SIDE PLATES FOR LARGE DRUMS
STRAINER SCREENS
SUCTION BOX TOPS
TAILING SCREENS
THICKENER SCREENS
TOP PLATES FOR LARGE DRUMS
WASTE CONVEYOR SCREENS

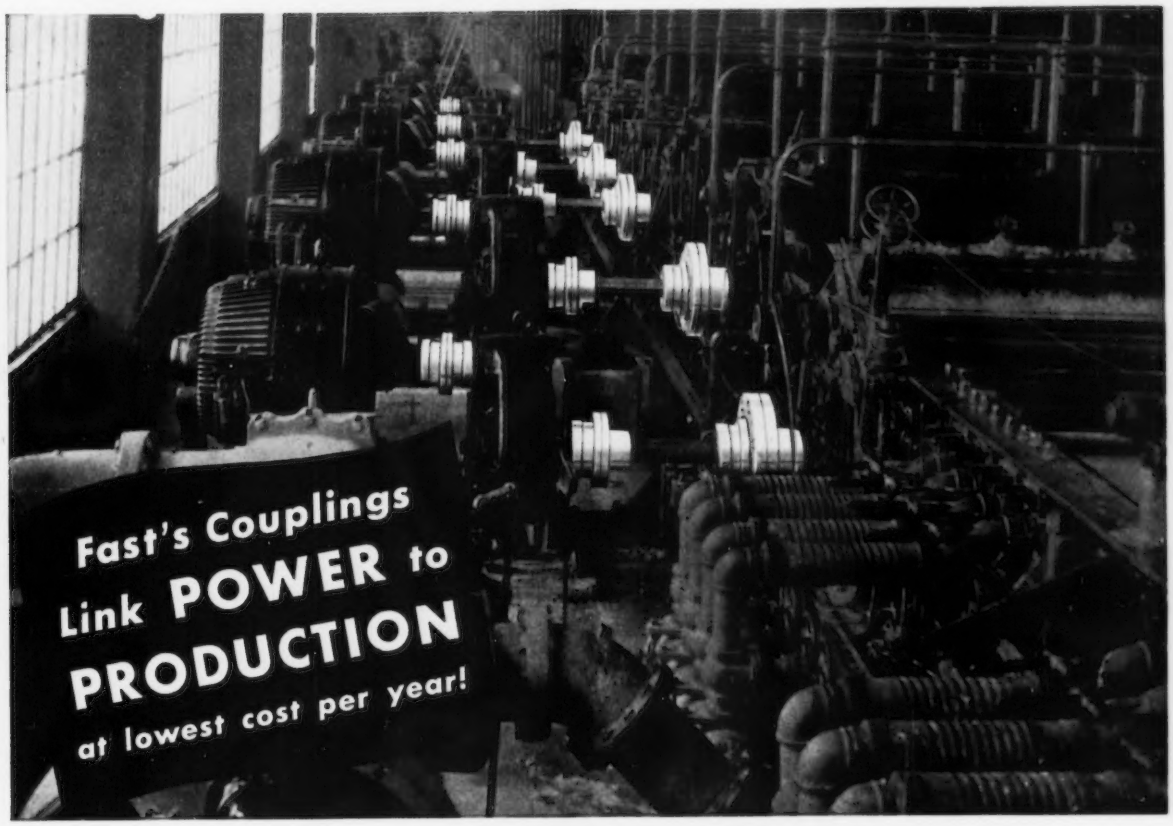
MANUFACTURED EXCLUSIVELY FOR THE INDUSTRY
BY
CHARLES MUNDT & SONS
53 FAIRMOUNT AVENUE, ESTABLISHED 1869 JERSEY CITY, 4, N.J.

LANGSTON
Slitters and Winders

Langston Slitters and Winders are built for a wide variety of work from light tissue to heavy board. All have heavy cast iron bedplate and box section side frames, insuring ruggedness and long life, all turn out top quality rolls. Ask for Bulletin #204 giving details.

SAMUEL M. LANGSTON CO.
CAMDEN, N. J.





Over half a million FAST'S Couplings now in use!

THROUGHOUT the paper industry, Fast's are recognized as the most dependable couplings on the market! Year in, year out, Fast's continue to *outlast the equipment they connect . . .* saving paper mills time, maintenance and money by eliminating costly coupling failures.

When you specify Fast's in your mill, you can forget about coupling worries. Actual cases on record show many Fast's have been in continuous operation for 25 or 30 years without trouble. *And every major producer of high-speed equipment now uses Fast's Couplings!*

KOPPERS® FAST'S THE ORIGINAL GEAR-TYPE Couplings

INDUSTRY'S STANDARD FOR 32 YEARS

For complete information, with drawings, specifications and photographs, write for our free catalog. Address your letter to: KOPPERS COMPANY, INC., *Fast's Coupling Dept.*, 274 Scott St., Baltimore 3, Md.

Here's How FAST'S Save You Money

Free Service—Koppers free engineering service assures you the right coupling for the job.

Rugged Construction—Fast's still maintains its original design, without basic change or sacrifice in size or materials. Result: freedom from expensive coupling failures.

Lowest Cost per Year—Fast's Couplings usually outlast equipment they connect. Their cost may be spread over many years!

KOPPERS COMPANY, INC., ***Fast's Coupling Dept.,***
274 Scott St., Baltimore 3, Md.

Gentlemen: Send me Fast's Catalog which gives detailed descriptions, engineering drawings, capacity tables and photographs.

Name _____

Company _____

Address _____

City _____ *Zone* *State* _____

PAPER PEOPLE

Champion Promotes Riley

Dwight Riley has been promoted to night boss machine tender of the Champion Paper and Fibre Co.'s Ohio Division. In his new assignment, Mr. Riley will supervise the night-time operation of paper machines in the Hamilton plant's No. 2 mill.

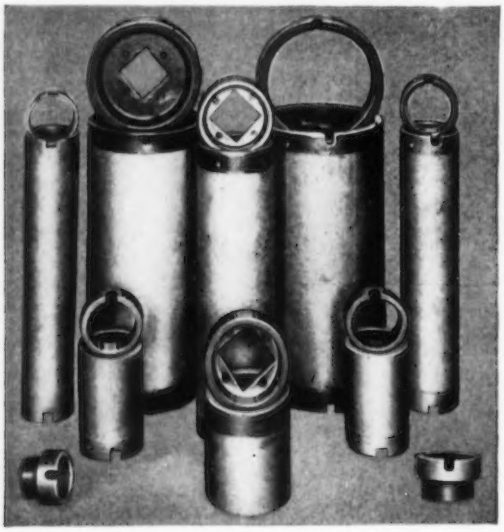
A veteran of 30 years in the paper industry, Mr. Riley started at Champion in February 1923, as a helper in the machine room. He progressed steadily and was advanced to machine tender in 1937, a position held until his recent promotion.

C-Z Promotes Holmes

J. Russell Holmes has been promoted to assistant sales manager of the newsprint and printing paper division of Crown Zellerbach with headquarters in San Francisco.

Mr. Holmes was formerly sales manager of the printing paper department of the Zellerbach Paper Co. division of Crown Zellerbach.

In his new position, he joins the staff of Vice-President G. E. Young. He started with the corporation as a salesman for the Zellerbach Paper Co. division in Chicago in 1939.



ELIXMAN
CORES
CAPS

Straight wound paper cores made in sizes from 2" to 10" inside diameter with any thickness wall required.

Long draw protected slot caps of heavy gauge steel in all standard sizes.

Heavy duty caps with reenforced square hole. This patented feature of reenforcement gives added strength and durability.

Samples of caps or cores will be gladly submitted

ELIXMAN PAPER CORE COMPANY, INC.

CORINTH, N. Y.

Lozier Named Vice-Pres. Of St. Regis

K. D. Lozier

St. Regis Paper Co. has elected Kenneth D. Lozier as a vice-president of the company. The board at its meeting also elected B. W. Recknagel as an assistant secretary.

Mr. Lozier, whose responsibilities include advertising and sales promotion for all divisions of the company, joined St. Regis 13 years ago.

Crystal Promotes Andy Barnickle

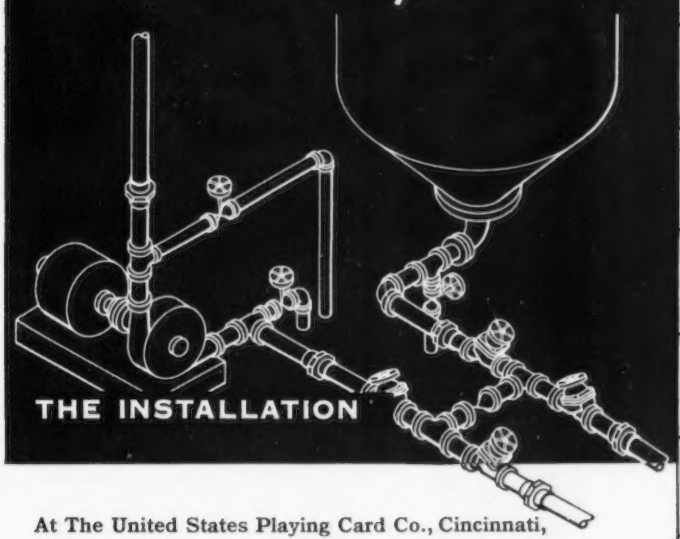
Andy Barnickle

Andrew "Andy" Barnickle, veteran machine tender at Crystal Tissue, has been promoted to tour foreman.

Andy has been employed in the Middletown paper industry for more than 30 years. His first job was with the old Wordlow & Thomas mill as fourth hand. He worked for 3 years at The Sorg Paper Co. before coming to Crystal as back tender in 1927.

In 1936 he was promoted to machine tender and in 1939 he left Crystal for a short time but returned later to his same job. Andy was one of the first Crystal papermakers to operate the Crystal No. 6 paper machine and has worked on most of the other paper machines at the mill. He is an ardent baseball fan and years ago played a great deal of baseball on the Crystal Industrial League team.

What a Difference in Valve Behavior ...on Heavy Coating Liquids for example



THE INSTALLATION

At The United States Playing Card Co., Cincinnati, using Crane Diaphragm Valves in handling paper coating "enamels" from storage tanks to pumps.

VALVE SERVICE RATINGS

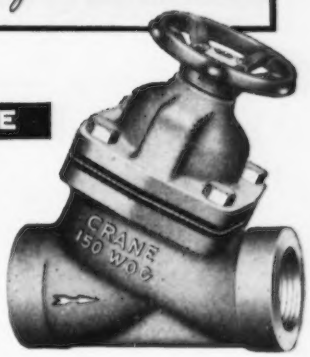
SUITABILITY:	None other like it
FEATURES:	Fluid can't get into bonnet
MAINTENANCE COST:	None
SERVICE LIFE:	No sign of wear after 3 years
OPERATING RESULTS:	Trouble and waste stopped
PRICE:	O.K. — no premium
AVAILABILITY:	Crane Catalog item No. 1610

THE CASE HISTORY

Previously, ground plug cocks and conventional gate valves were used. During normal shutdowns the heavy coating liquid would build up on seating surfaces, in stem threads and working parts. The cocks and gates would "freeze up"; were hard to operate, couldn't be shut tight. Recurring maintenance, cleaning, and replacements were a costly, annoying problem.

Switching to Crane Diaphragm Valves solved the problem. Their sealed-to-fluid bonnet and soft disc insert did the trick. None of the 48 Crane valves installed beginning more than 3 years ago, has needed service of any kind. They continue to operate freely and easily.

THE VALVE



There are many more ways you can benefit by complete, dependable isolation of fluid and valve working parts. Crane Packless Diaphragm Valves are equally effective under corrosive conditions, and on erosive fluids—sludges, slurries, etc. They also keep your product contamination-free. Choose these valves to your needs from a wide variety of body, disc, disc-insert, diaphragm, and lining materials. See your Crane Catalog or local Crane Representative.

THE BETTER QUALITY...BIGGER VALUE LINE...IN BRASS, STEEL, IRON

CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

Wausau Changes

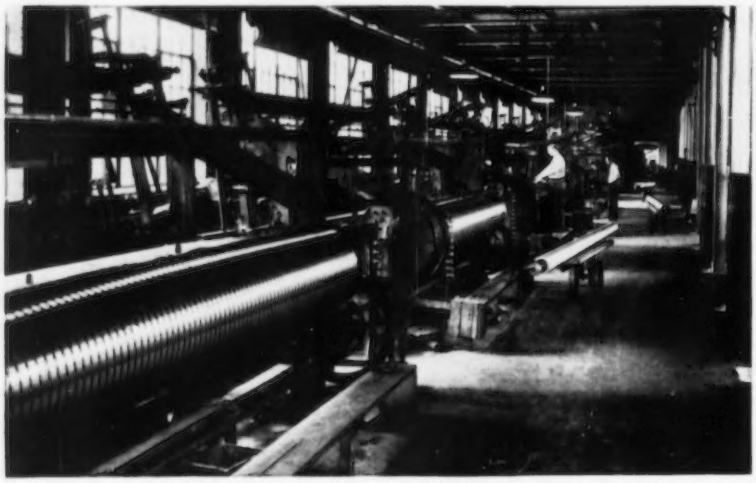
Wausau Paper Mills Co., Brokaw, Wis., have made the following additions in the executive sales headquarters at Chicago:

Dave E. Marx has been appointed to the sales staff, coming to Wausau after being associated with the Thumb Merchandise Co. in Michigan, followed by five years representing Port Huron Sulphite & Paper Co. in the Midwestern territory. He is a member of the Salesmen's Assn. of the Paper Industry.

Ron J. Garner has been appointed as head of the Order Department in the executive sales headquarters at Chicago, having been transferred from the mill, where he spent several years.

Davies Succeeds Beine at C-Z

Emory Davis has been appointed manager of the Oakland Division of Crown Zellerbach Paper Co., effective May 1. Mr. Davis has been associated with Zellerbach Paper Co. since 1929. He has served as general sales manager of the Oakland division since May last year. In his new post, Mr. Davis succeeds Ernest F. Beine, who has been manager of that division since February 1948, but who is at his own request taking early retirement under the corporation's retirement program.



The

WIDEST

Fourdrinier Wires

The fact that Lindsay is now weaving the widest Fourdrinier wires in this country is an indication of the extensive resources, facilities and experience at your command and that of the industry to further the art of paper making.

THE LINDSAY WIRE WEAVING COMPANY • CLEVELAND 10, OHIO

Lindsay WIRES FOR PAPER MILLS

Plunguian Joins Southern Chemical Cotton

M. Plunguian

Mark Plunguian has joined Southern Chemical Cotton Co., Chattanooga, Tenn., as director of research. Dr. Plunguian previously headed woodpulp research at the Summit, N. J., Central Research Laboratory of Celanese Corp. of America.

Leonhard Heads Paterson Parchment

E. R. Leonhard

E. R. Leonhard has been elected president of the Paterson Parchment Paper Co., Bristol, Pa. Following his graduation from Dartmouth, he was employed in the Accounting Department of this company in 1920. In 1922, he was made traffic manager, and in 1925, he joined the Sales Department. In 1935, he was named assistant director of sales. From 1938 until his election as president, he was vice-president in charge of salse.

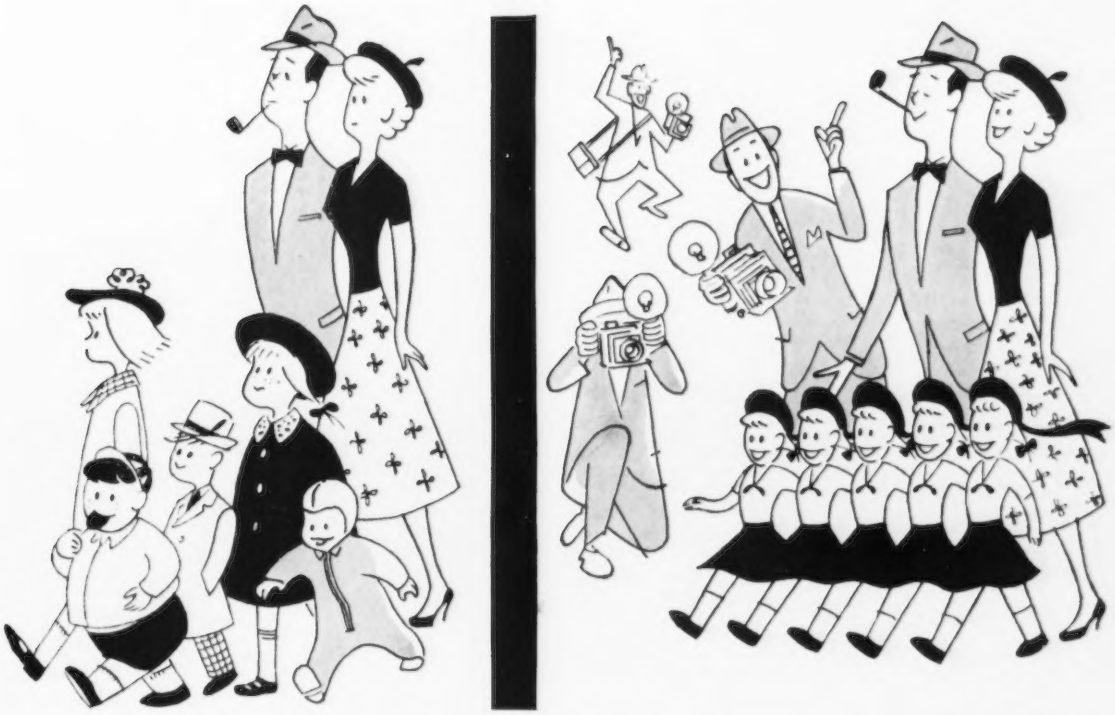
Changes at Albemarle

Albemarle Paper Mfg. Co., Richmond, Va., has recently made the following management changes:

Charles H. Robertson from production manager of the Richmond, Va., plants of the company to director of labor relations for all divisions of the company.

F. D. Gottwald, Jr., from assistant

Uniformity makes the difference . . .



. . . in "paper-rated" cotton linters

Paper-Rated cotton linters are specially selected on a basis of cleanliness, staple length, color, and character to meet your needs in paper-making.

But, in addition, you need uniformity, shipment after shipment. To assure this uniformity Railway Supply maintains a full-time staff of seven government-licensed graders in the linter producing areas. These cotton experts carefully test and grade every lot before releasing it for shipment.

There's good reason why the paper industry looks to Railway Supply for Paper-Rated linters . . . *Uniformity makes the difference.*

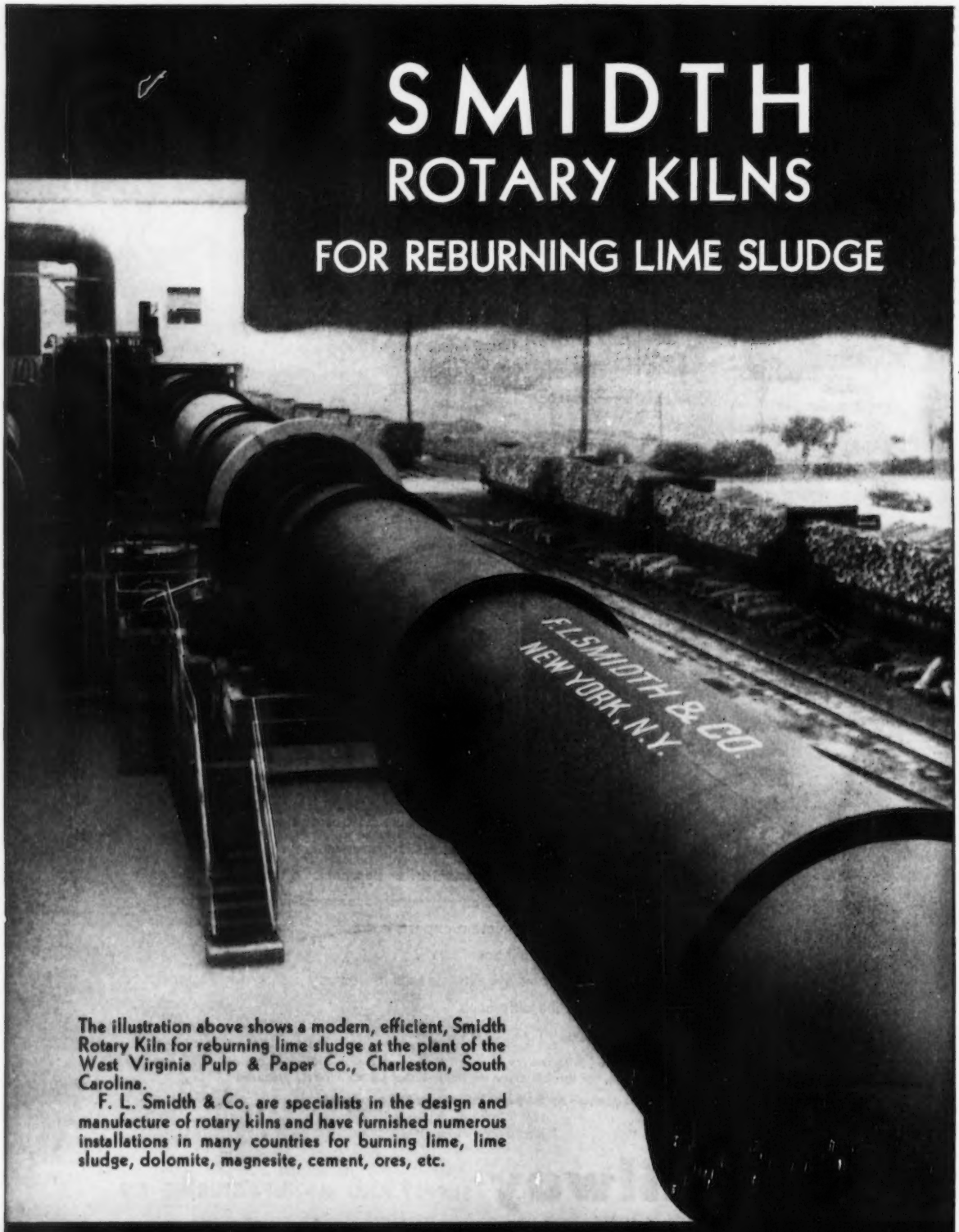
Write for the full story on Paper-Rated Cotton Linters, prepared exclusively for the paper industry by Railway Supply.

Railway SUPPLY AND MANUFACTURING CO.

335 West Fifth Street, Cincinnati 1, Ohio

MEMPHIS • DALLAS • LOS ANGELES • ATLANTA • CHARLOTTE • NEW YORK • CHICAGO

SMIDTH
ROTARY KILNS
FOR REBURNING LIME SLUDGE



The illustration above shows a modern, efficient, Smidth Rotary Kiln for reburning lime sludge at the plant of the West Virginia Pulp & Paper Co., Charleston, South Carolina.

F. L. Smidth & Co. are specialists in the design and manufacture of rotary kilns and have furnished numerous installations in many countries for burning lime, lime sludge, dolomite, magnesite, cement, ores, etc.

F. L. SMIDTH & CO.

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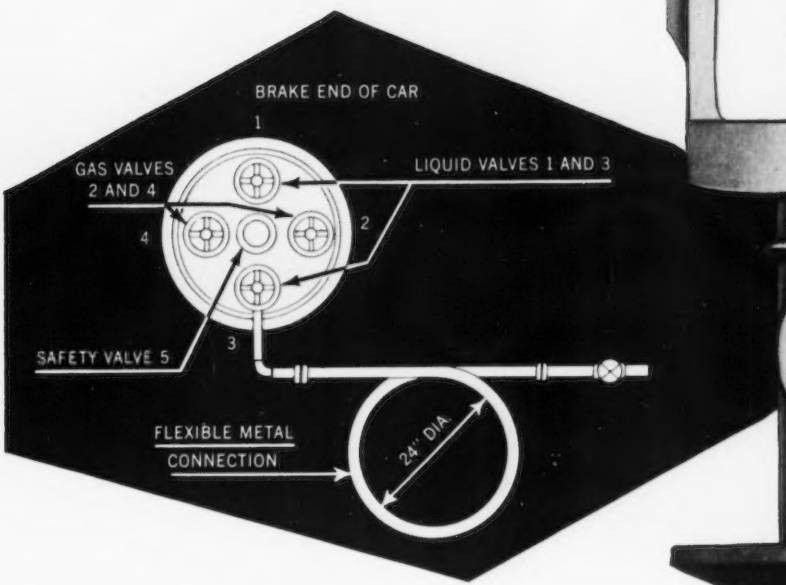
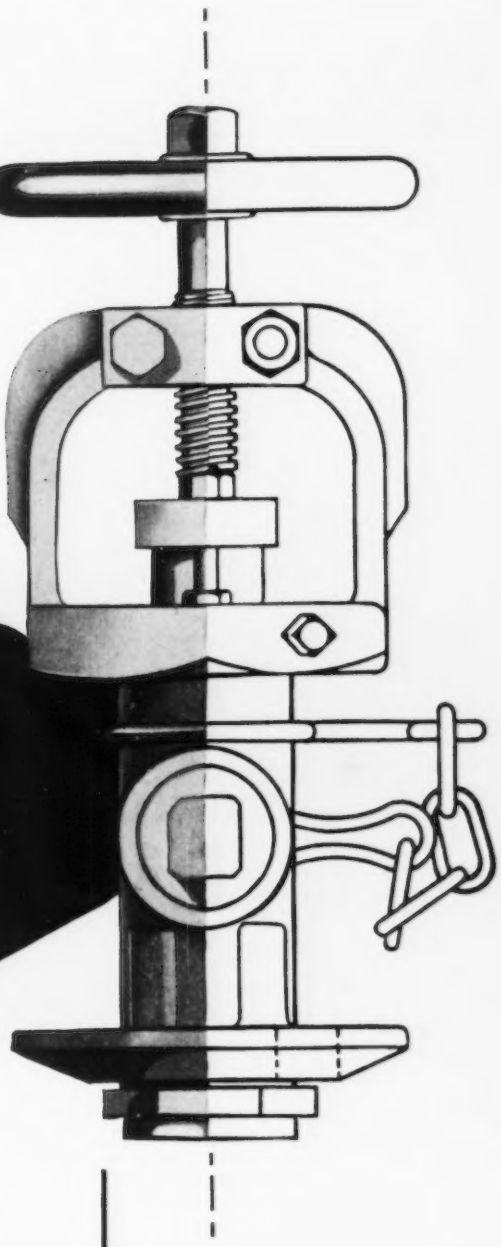
Chemicals you live by

if you use CHLORINE





use it safely

Chlorine is plentiful, useful and inexpensive. *But it must be handled properly* for maximum benefit and safety. That is why we have made a specialty of studying and assembling all the facts, all rules and regulations, on shipping and handling Chlorine. The drawing above is from our Handbook prepared by our experts for the guidance of all people who work with Chlorine.

Our storehouse of experience is available to any company that uses Chlorine. Whatever your handling problems may be, a DIAMOND expert is ready to come to your plant to advise and work with your people. For this free service, just call your nearby DIAMOND Sales Office or write:

Chemicals for the Paper Industry

LIQUID CHLORINE
SODA ASH CAUSTIC SODA
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DIAMOND ALKALI COMPANY
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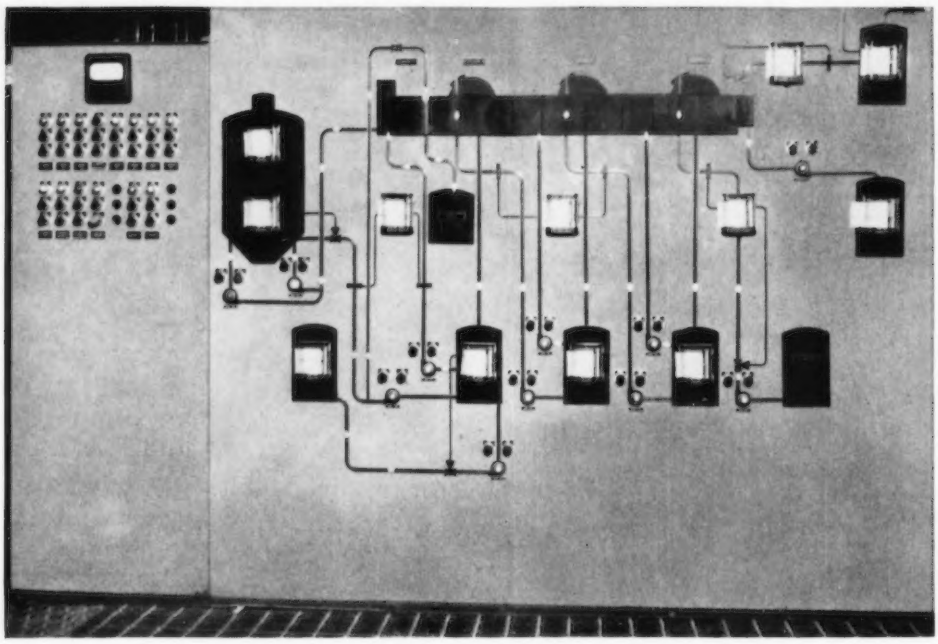
Sales Offices in NEW YORK, PHILADELPHIA, PITTSBURGH, CLEVELAND, CINCINNATI, CHICAGO, ST. LOUIS, MEMPHIS AND HOUSTON.

DIAMOND ALKALI CHEMICALS ®

HOW MANY STEPS



can this graphic panel save YOU?

Only you can figure out the steps—and the valuable time—you would save with a Taylor Graphic Panel, similar to the one shown above, in use at the plant of a well-known northwestern paper manufacturer. The Taylor TRANSET* Recorders show the whole picture of the pulp washing process, from the blow tank, through the knotter, and the three stage washer to the brown storage tank.

By looking at this one panel, the operator can tell the level and consistency in the blow tank, flow of all the liquor to all stages of washing, level of the liquor in all three filtrate tanks, level in black liquor storage, level and flow of the white water, and level in the brown stock storage tank.

Taylor Controls automatically regulate consistency in the blow tank, flow and tank level of the liquor wherever required, and flow and level of the white water.

One man can keep tabs on the entire process and, with the help of Taylor Controls, keep flow and level at all stages just where he wants it. In fact, a single operator started up this new plant in five minutes, without an error.

Taylor Graphic Panels for Bleach Plants, Stock Handling, Screen Rooms, Digesters, etc., can be designed for your individual requirements. Ask your Taylor Field Engineer, or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

*Reg. U. S. Pat. Off.

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

FLINTKOTE ORDERS 44 MORE LUKENWELD JACKETED DRIERS AFTER FIRST 12 DELIVER BONUS OUTPUT

Lukenweld rolls now in 4 Flintkote plants

When The Flintkote Company wanted increased output of paper for roofing felt, they turned to Lukenweld Jacketed Steel driers.

In 1949, Flintkote added 12 Lukenweld driers to the dry end at its Lockport, N. Y. plant. The Lukenweld driers, 6 of which replaced ordinary driers, were designed to operate at 170-200 psi—three times the pressure of the old driers. No other expansion in equipment, no more plant capacity or space. Result: a 50% boost in tonnage on each Lukenweld drier.

Since 1949, Flintkote has re-ordered each year for its plants:

1950—a 10-drier section for Little Ferry, N. J.
1951—a 26-drier section for Mt. Carmel, Ill.
1952—an 8-drier section for New Orleans, La.

Proven performance is one reason producers like Flintkote invest in Lukenweld driers, either as individual units or complete sections. Lukenweld Jacketed driers can be designed to operate at pressures higher than 350 psi. Because they can't fail by shattering, Lukenweld driers are endorsed by the nation's leading insurance companies. You'll find, too, that the rolled steel plate of Lukenweld driers permits a shell 40 to 75% thinner than ordinary rolls, giving you faster heat flow, rapid heat-up and quick shut-down.

Designed for quick reflection of temperature and pressure variation—surer quality control to meet today's competitive market conditions, Lukenweld rolls also have no heads to crack, no gaskets to blow out, virtually no maintenance.

LUKENWELD

DIVISION OF LUKENS STEEL COMPANY

LUKENS

SEND FOR FREE BOOKLET

Lukenweld Division of Lukens Steel Company
403 Lukens Building, Coatesville, Pa.

Gentlemen:

Please send me your free color booklet, "10-67 Percent More Production," containing information on Lukenweld Jacketed Drier Rolls. I understand there is no obligation.

NAME.....

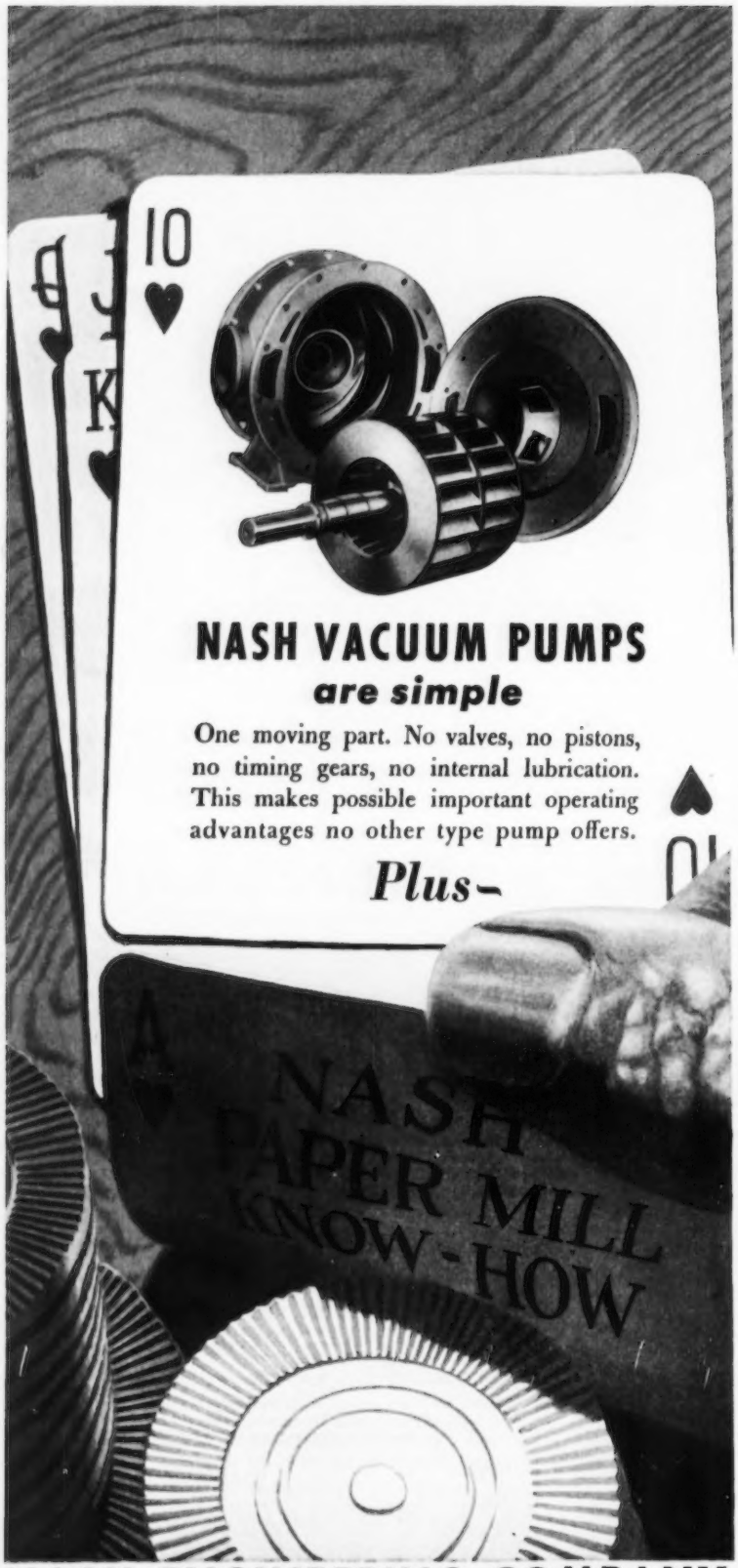
TITLE.....

COMPANY.....

ADDRESS.....

CITY.....STATE.....

A-465


10
NASH VACUUM PUMPS
are simple
One moving part. No valves, no pistons, no timing gears, no internal lubrication. This makes possible important operating advantages no other type pump offers.
Plus—
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PAPER MILL
KNOW-HOW
NASH ENGINEERING COMPANY
414 WILSON AVE., SO. NORWALK, CONN

production manager of the Richmond plants and acting superintendent of the Brown's Island plant in Richmond to production manager.

John S. Halsey from superintendent of the Waterproof Paper Plant in Richmond to assistant production manager.

Gordon A. Trainham and J. B. Combs from assistant superintendents respectively of the two above plants to superintendents thereof.

C. A. Garrison and M. A. Nuckhols from foremen in the above plants to assistant superintendents thereof.

S. T. McClanahan from assistant superintendent in charge of maintenance, Brown's Island plant to assistant plant engineer, and W. T. Johnson from junior engineer to assistant superintendent in charge of maintenance, Brown's Island plant.

The company, founded in 1887, still operates its original paper mill in Richmond known as the Hollywood plant. In 1920 it acquired the Brown's Island Paper Mill in Richmond and in 1925 built the Waterproof plant building in Richmond which also houses the Multi-Wall Sack plant rather recently started. In 1937 the company acquired the Halifax Paper Co., Inc., in Roanoke Rapids, N. C., and has expanded it materially, especially with the start up in January of this year of a new multi-million dollar paper mill there.

Quits Herty Lab To Join Valentine

W. L. Hendrix, veteran official of the Herty Foundation Laboratory, has resigned to accept a post as superintendent of the new bagasse paper mill at Lockport, La., effective June 1.

Mr. Hendrix will be superintendent at the Valentine Pulp and Paper Co., which is to manufacture newsprint and other papers from sugar cane fibre. Initially, capacity of the mill will be approximately 17,250 tons of paper and dissolving pulp annually. Within 100 miles of the mill site, 750,000 tons of bagasse are produced annually and only about 200,000 tons are being commercially utilized.

Mr. Hendrix came to Herty in 1933, right after graduation, to take an engineering post in the laboratory. He was one of the workers with the late Dr. Charles H. Herty in his original project to make newsprint out of southern pine.

He once served as director of the laboratory but in more recent years has held the title of production director being concerned with the test runs on the pilot paper making machine at the laboratory. His work has been commended by all those using the facilities at the laboratory, and on many occasions paper mill executives sought to lure him away.

R. L. Boyd

Boyd Gives Lecture on Wallpaper Manufacture

On March 30, R. L. Boyd, vice-president in charge of manufacturing operations, United Wallpaper, Inc., presented a lecture on "Wallpaper" to Adult Education class at Western Michigan College, Kalamazoo, Mich. The class is a part of the Pulp and Paper Curriculum and laboratories sponsored by the Advisory Committee on Pulp and Paper Technology.

Mr. Boyd's lecture, together with those of other well-known paper converting experts given during the class year, will become a part of a textbook to be published in time for the 1953-54 class. The textbook is being edited by Alfred H. Nadelman, Professor and Head of the Curriculum in Pulp and Paper Technology, and J. Galbraith, Technical Director, Sutherland Paper Co. The book will be published by Lockwood Trade Journal Co., New York City.

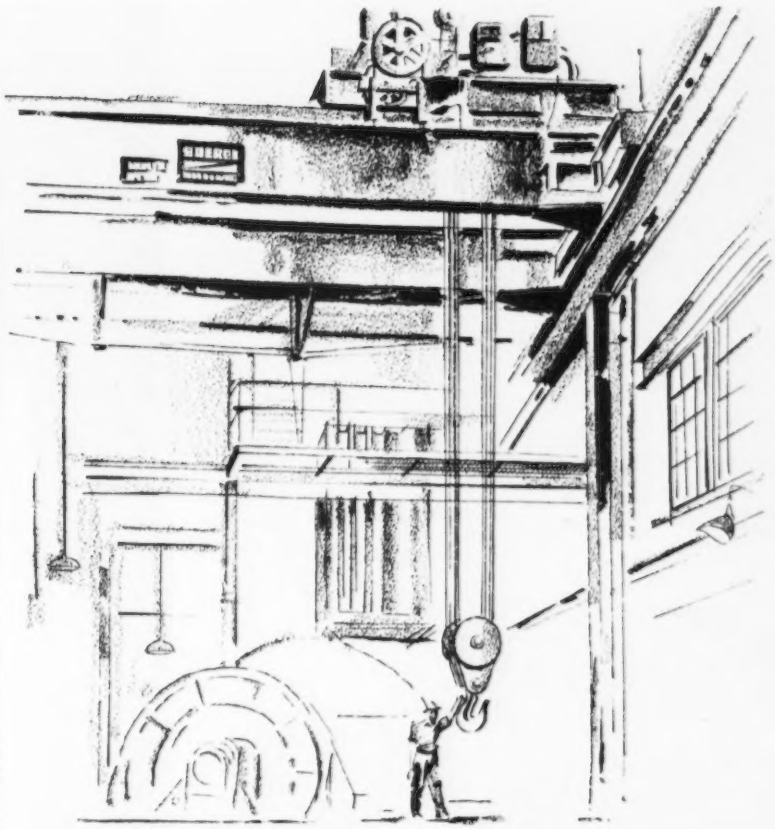
The context of Mr. Boyd's lecture dealt chiefly with wallpaper manufacture and laid particular emphasis on the quality and technical aspects of the industry's raw paper requirements.

Union Bag Promotes A. G. Naudain

Union Bag and Paper Corp. promoted Albert G. Naudain to the position of board sales manager for the company's board and corrugated container division.

Container Corp. To Build Container Plant at Fernandina

Container Corp. of America have approved the building of a corrugated container plant at Fernandina, Fla., adjacent to the kraft containerboard mill. Plans are being completed and construction and machinery contracts will be awarded immediately. It is hoped to have the plant in operation within twelve months.



Tell us what you want to move... we'll "job-engineer" a crane to move it

Special cranes for the pulp and paper industry are everyday business with us at EDERER. The job requirements of this industry call for many types of specialized cranes . . . cranes with extremely high lift, low head room, canting cranes, roll-handling cranes, stand-by cranes [like the crane shown here]—and others. EDERER has been working with this industry for most of its 50 years—and has "job-engineered" cranes for these many varied job requirements—for the leading pulp and paper manufacturers.

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50 YEARS "JOB-ENGINEERING" SPECIALIZED CRANES

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Consulting Engineers to
The Pulp and Paper Industry
Since 1929

Egan
Designers
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TREATERS
AIR DRYERS
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Special Machinery for Paper Converting
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Write for pamphlets
FRANK W. EGAN & COMPANY
BOUND BROOK, NEW JERSEY

Restigouche
BLEACHED SULPHITE PULP
for the manufacture of cellophane, rayon and paper products
RESTIGOUCHE COMPANY, Ltd.
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It will speed the reply to your inquiry to mention Paper Trade Journal.

SUPPLIERS NEWS

N. F. Hoch

E. D. JONES & SONS CO., Pittsfield, Mass., manufacturers of stock preparation machinery, have appointed two project engineers to superintend development of two new machines, which have been licensed to the Jones company by E. & M. Lamont Sons of France, for manufacture and distribution in North America. The machines are described on the "New Equipment" page of this week's issue of *Paper Trade* JOURNAL.

Richard E. Bodette will be in charge of the Jones Lamont Cellular Filter. For over four years, Mr. Bodette was beater room superintendent, St. Regis Paper Co., Deferiet, N. Y.; prior to that, he was beater room engineer for 13 years at Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis. In both mills the beater room supervisor was responsible for water treatment and fiber recovery.

Norman F. Hoch will be responsible for the Jones Lamont Vibrant Screen. Mr. Hoch's experience includes four and a half years with Spruce Falls Power & Paper Co., Kapuskasing, Ont., where he was design engineer, and seven years as plant engineer for Alliance Paper Mills, Ltd., Merritton, Ont.

R. E. Bodette

BOOZ, ALLEN & HAMILTON, management consulting firm, have been admitted to partnership in the firm Richard S. MacKenzie of Chicago. Mr. MacKenzie was formerly assistant to the president of Union Bag & Paper Corp.

LOCKPORT FELT CO. has elected William J. Campbell, Jr., vice-president in charge of sales. This office was held by the late Bertram A. Audley.

Mr. Campbell has been with Lockport Felt since 1934 except during World War II when he served with the Seabees in the Pacific Theatre of Operations. He was engaged in various phases of felt manufacturing before entering the Sales Department in 1938. He was made assistant sales manager in 1951 and sales manager in August, 1952. He has been a member of the board of directors since 1946.

G. H. Collins

WARREN STEAM PUMP CO., INC., Warren, Mass., manufacturers of centrifugal, reciprocating and rotary pumps, have appointed Wilcox Engineering Co., 126 Wellington Place, Cincinnati 19, Ohio, as area representatives.

Glenn H. Collins, working out of their Cincinnati office and associated with the pump business in this territory since 1935, will concentrate on Warren and Warren-Quimby Pump sales and service, covering Western and Southern Ohio and most of Kentucky.

Have Them HAYDENIZED!

BEFORE AFTER
Worn, corroded, out-of-round, warped rolls resurfaced, reconditioned and trued to factory-new precision and efficiency at prices that spell genuine economy for you.
Write or phone SPRINGFIELD 3-6984 for prompt, expert service.
THE HAYDEN WIRE WORKS, INC.
Wire Cloth Dandy Rolls Cylinder Moulds Metallizing
31 SYLVAN, WEST SPRINGFIELD, MASS.

NEW EQUIPMENT

(Continued from page 32)

the meter is linearly proportional to the torque, and the angular movement of the chart on the meter is linearly proportional to the rate of shear. In this way a rheogram for the test material is automatically plotted by turning the crank of the variable speed transmission. It is usually found desirable to replot the rheogram on rectalinear graph paper for making calculations, but this is often unnecessary for simple rheograms.

The maximum rate of shear developed by the viscometer is 8400 reciprocal seconds. The minimum viscosity which can be measured at this rate of shear is about 0.3 poise and the maximum viscosity is about 12.0 poises. This viscosity range is suitable for most if not all coating colors and pigment slurries employed in the paper industry.

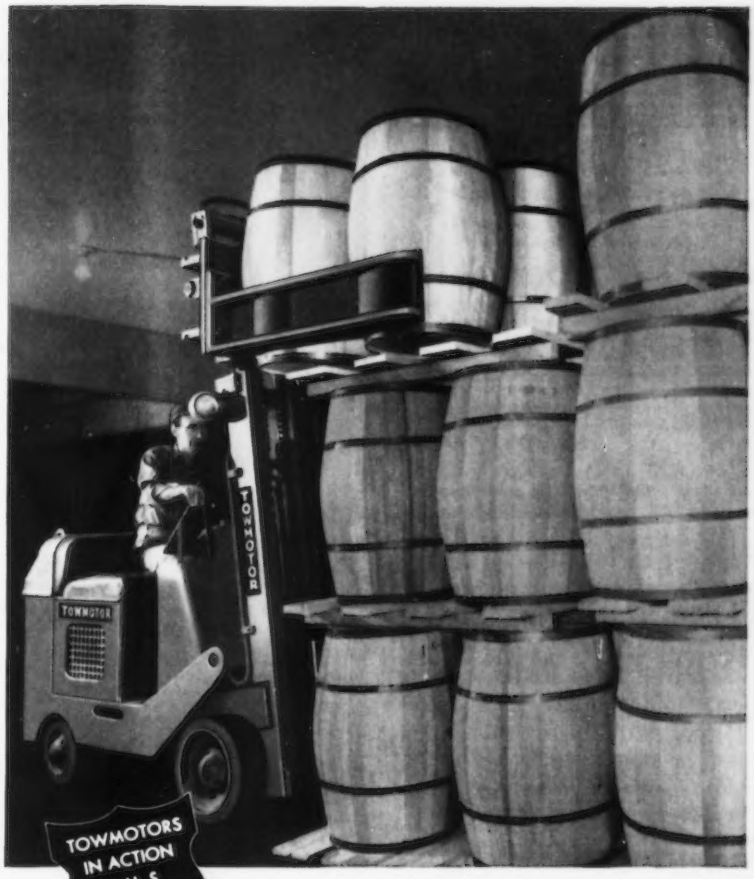
The original unit has been in operation over one year, and additional facts on its performance, as revealed in Mr. Thompson's article, are available from the manufacturer.

Magnetic Hump for Iron Removal in Liquid Lines

Designed to operate with pressures up to 45 p.s.i., the non-electric Magnetic Hump Separator for removal of tramp iron in liquid lines is now being offered by Eriez Manufacturing Co., Erie, Pa. Construction of the unit is said to permit increased flow velocities without sacrifice of magnetic efficiency.

The pressure-tight magnetic hump deflects line flow 30 degrees with baffle plates and hump elevation. Material then flows over the faces of two special plate magnets, one located on each side of hump. The magnets, built with stepped pole plates on the down-stream side, are positioned in a housing constructed of ¼ in. thick, stainless steel or black iron, depending on the application. Pressure-tight handholes in the side plates are provided for cleaning the magnets.

The units are available in diameters ranging from six in. to 20 in. in increments of two inches. Neoprene gaskets form the pressure seals. Adaptors to convert from round pipe to rectangular opening of the hump can be furnished as extra equipment.



Triple-tier stacking of a 2,088-pound load of heavy chemicals at Westvaco Chemical Division, Carteret, N. J.

Tuck 'em in snug...

Stretch both storage capacity and your operating budget . . . by stacking extra-large loads extra tiers higher. That's just one of many ways that widely adaptable Towmotor takes the hobbles off your materials handling routines for greater efficiency. Any one alone totals up savings that pay for Towmotor many times over. Methods which make these savings a reality are described in a new book titled "Man-Hour Thieves." Write for your copy, and name of your nearest Towmotor Representative, to: Towmotor Corporation, Div. 1704, 1226 E. 152nd Street, Cleveland 10, Ohio.

Be sure to see the Towmotor Exhibit at the 5th National Materials Handling Exposition starting May 18, 1953

TOWMOTOR
THE ONE-MAN-GANG ®

FORK LIFT TRUCKS and TRACTORS
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TOWMOTOR ENGINEERED FOR QUALITY PERFORMANCE

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FOR ALL EQUIPMENT EXPOSED TO CORROSION BY SULPHITE ACIDS OR OTHER CORROSIVE AGENTS
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Non-Returnable, Durable standard mill core.
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Returnable and Non-Returnable extra strong mill core for regular and special needs.
ANY LENGTH, DIAMETER AND THICKNESS
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NEW YORK OFFICE—500 5th AVE.

AMERICAN PAPER AND PULP ASSOCIATION'S PAPER PRODUCTION RATIO REPORT

(Production as per cent of normal capacity)

COMPARATIVE WEEKLY SUMMARIES

	Mar. 14	Mar. 21	Mar. 28	Apr. 4	Apr. 11
1953	96.0	95.1	94.3	92.1r	91.9
	Mar. 15	Mar. 22	Mar. 29	Apr. 5	Apr. 12
1952	94.5	94.3	94.3	92.6	90.9

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Ave
1952	97.1	97.8	95.1	90.4	87.9	87.6	73.3	86.1	81.7	90.7	90.5	85.6‡	89.6‡
1953	95.0‡	94.9‡	94.8‡										

COMPARATIVE YEARLY SUMMARIES

	1946	1947	1948	1949	1950	1951	1952	1953
Year to Date	99.7	104.9	100.5	91.7	95.1	101.3	96.6	94.5
Year Average	96.9	101.7	92.1	83.7	95.8	98.0	89.6‡	

‡ Preliminary.
r Revised.

PAPERBOARD OPERATING RATIOS †

	Mar. 14	Mar. 21	Mar. 28	Apr. 4	Apr. 11
1953	94	95	94	95	90
	Mar. 15	Mar. 22	Mar. 29	Apr. 5	Apr. 12
1952	85	85	84	83	81

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1952	81	86	85	82	82	82	71	89	88	96	96	85	85
1953	91	95	95										

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

Note: In the above tables *all* the ratios shown are on the basis of a normal 6 and 7 day capacity.

† Per cents of operation based on "Inch-Hours" reported on a 6-day basis to the National Paperboard Association.

ASSOCIATIONS

(Continued from page 30)

On Saturday morning, the ladies will have the opportunity to visit various historic landmarks in Trenton. After lunch, a card party has been arranged for them.

George M. Suydam, Riegel Paper Corp., Riegelsville, N. J., chairman of the Pennsylvania-New Jersey-Delaware Div., suggests that room reservations for the meeting should be made direct with the hotel. To be sure of a room, he advises that letters be addressed to Walter Osterstock, Hotel Stacy-Trent, Trenton, N. J. Each request for a reservation should mention that "I am attending the Superintendents Convention."

A. M. MEINCKE & SON
INC.
Materials for Paper Making
A. M. MEINCKE & SON INC. CHICAGO, ILLINOIS
7 SO. DEARBORN ST.
CHICAGO, ILL.

Pulp and Lumber Men Meet in Franklin County, Mass.

More than 150 foresters attended a panel meeting, April 9, in the Franklin County Grange Hall, Greenfield, Mass. It was the fifth annual meeting of this group, and the feature of the evening was a panel discussion on forestry management, utilization, and marketing.

Among the panel members were two paper company foresters: Richard Ashton, Champion International Co., Concord, N. H., and Robert Babbit, West Virginia Pulp & Paper Co., Brattleboro, Vt. Also participating on the panel were K. Dubuque, Ashfield Dist. forester; R. Denison, Greenfield forester; F. Smale, Cowles Co., Amherst; W. McConnell and H. Rich, Forestry Dept., University of Mass.; R. Parmenter and D. Thayer, Extension Service foresters.

Franklin County operators were keenly interested in predictions by the pulp and paper men that the market for rough or unpeeled hardwood would increase next fall. One pulp man stated that his company was buying all peeled hardwood pulp on contract in whatever quantities the local operators could supply.

1853 1953 100th Anniversary

LYDDON & CO.

PARSONS & WHITTEMORE
250 Park Ave., New York 17

Dinner Meeting—Metropolitan District Empire State Section, TAPPI

The Metropolitan District of the Empire State Section of TAPPI held its regular dinner meeting at Fraunces Tavern, New York City, on April 14, with Chairman Paul L. Haggerty presiding and about 70 members and guests in attendance. Officers for the coming year were elected as follows: Chairman: Ralph W. Kumler of the American Cyanamid Co.; chairman-elect: John C. Rice of the Lowe Paper Co.; secretary-treasurer: John H. Doherty of Union Bag and Paper Co.; members at large of the advisory committee: A. V. Arenander, Jr., of West Virginia Pulp and Paper Co.; Walter T. Cusack of Aldine Paper Co.; L. E. Georgevits of Titanium Pigments Corp.

Consumer unit packaging was discussed by a panel of experts with L. C. Cartwright of Foster D. Snell, Inc., as moderator. Charles M. Woodcock of the General Foods Corp. opened with an informal discussion of the importance of proper packaging and the necessity of using materials giving moisture vapor resistance, grease resistance and frequently odor and gas resistance. He also stressed the importance of aesthetic appeal. Paul K. Wolper of Riegel Paper Corp. continued this theme and pointed out how the desirable functional properties could be brought about by modern converting methods, such as the various processes of surface coating and laminating. Walter L. Hardy continued the discussion with particular reference to the testing of food packages and food packaging materials. The usual excellent question and answer period followed the talks.

The next meeting will be Ladies Night, Tuesday, May 12, with a special dinner at Fraunces Tavern at 6:15 p.m. Donald Lowe of the Lowe Paper Co. will describe his recent European experiences.

Pulp Companies Will Be Invited Into New Rayon Bureau

According to recent report, suppliers of dissolving pulp and chemicals for the manufacture of rayon will be invited to join the newly formed Rayon Information Center. This Center is a promotional bureau underwritten by five leading yarn producers to stimulate production and sales of viscose rayon and cuprammonium rayon.

Headquarters of the bureau are at 670 Fifth Avenue, New York City. $750,000 has been appropriated to finance the first year operations. Charles W. Rice, Jr., is chairman of the steering committee that organized the bureau.

The five subscribing companies are American Bemberg and North American Rayon Corp.; American Enka Corp.; American Viscose Corp.; E. I. du Pont de Nemours & Co., and Industrial Rayon Corp. Other companies making viscose rayon have been invited to join the organization.

APPA Announces Three Community Relations Discussions

D. M. Rochester, Administrative Assistant, American Paper and Pulp Assn., will be present at three area discussion meetings sponsored by APPA on the subject of Community Relations.

Savannah—Pulp and paper men from North Carolina, South Carolina, Georgia, Tennessee, Florida and Alabama will meet for their first Community Relations Program at the Hotel De Soto at Savannah, Ga., on May 5-6. The meeting is being called to introduce a Community Relations program to the pulp and paper industry in the Southeast.

Among the speakers at this kick-off meeting will be: T. T. Dunn, Donald J. Hardenbrook, Kirk Sutlive and G. W. E. Nicholson, all of Union Bag & Paper Corp.; Hugh C. Hoffman, of Opinion Research Corp., Princeton, N. J.; E. W. Tinker, executive secretary, APPA.

Springfield—Southern New England paper makers will meet at the Sheraton Hotel, Springfield, Mass., on May 19, to discuss "Economic Education." The meeting is also being held under the auspices of the APPA Community Relations Committee.

Frank Thompson, Champion Paper and Fiber Co., Hamilton, Ohio; J. P. Nolan, Oxford Paper, Rumford, Me.; and J. J. Coote, American Economic Foundation, New York City, will be members of the panel. Carl M. Fellows, Fitchburg Paper Co., will be the moderator.

Syracuse—Paper mill men will discuss "Economic Education" at the Hotel Syracuse, May 21. This program will bring together as a panel the same group that appeared at the Springfield meeting. David C. Knowlton, president of Knowlton Brothers, Watertown, N. Y., will be the moderator.

Resume Construction At St. Joe

Work has been resumed on the final stages of construction of the $25 million plant expansion project of the St. Joe Paper Co. at Port St. Joe, Fla., following settlement of the second strike there in recent months. Perry Whetstone, project manager for the Tidewater Construction Co., Norfolk, Va., which is building the plant addition, said that workers had refused to cross a picket line set up by an AFL laborers union. No details were announced as to the causes for the dispute or the terms of settlement. The new plant, which will increase daily pulping capacity at the Port St. Joe mill from 400 tons to 1200 tons, is approaching completion.

Keasby & Mattison Constructs New Engrg. Bldg.

Keasbey & Mattison Co., Ambler, Pa., have plans underway for a completely new Central Engineering Department to handle all phases of engineering development in the organization. The contractors are the Austin Co. Completion is scheduled for the end of this year. The entire project is under the direction of R. A. Schneider, chief engineer.

Longview's Blow Tank Back in Operation

The kraft pulp mill blow tank which exploded at the Longview Fibre Co. on January 19, resumed operations on April 4.

Longview's ninth digester has been placed in operation. The digester boosts the plant's pulp production capacity to about 80 tons daily.

Employes were working on the installation of the digester in the pulp mill when the explosion occurred. Installation was interrupted during reconstruction of the giant blow tank.

Additional safeguards were provided in the revamped blow tank "that make such an explosion impossible even under abnormal conditions," according to R. S. Wertheimer, vice-president and resident manager.

Indian Mill Will Produce Fine Paper From Bamboo

Ballarpur Paper Mills Ltd., located at Ballarpur in the Central Province of India, will start up its new plant by the end of this month. The mill will be producing 25 to 30 tons of writing and printing paper per day using bamboo (dendrocalamus striclus) as raw material. It will employ the sulphate cooking process of making pulp.

The machinery for this mill was supplied by John Inglis Co., Ltd., of Toronto, Ont. Erection work was carried out by an Indian staff under the direction of Brian V. Moss, erection superintendent, whose services were made available by the John Inglis Co.

PAPER TRADE JOURNAL

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MEN WANTED—POSITIONS OPEN

We can place—Mill manager Fourdrinier mach., large plant; production supt. with asbestos cement experience; wet mach. board mill supt. also asst. supt. and salesman; paper sales mgr. Chicago area; coating technician, $8,000-$10,000; assistant steam and electrical engineer.

Mechanical engineers, instrument engineer; master mechanics; design draftsmen of machinery and buildings, chem. processing, $5,000-$7,000; chemists, chem. engineers and laboratory men, $5,000-$8,000; material handling engineer, attractive salary; salesman for fine printing papers in Boston area.

Cylinder — Fourdrinier mach. foremen; board salesman for Boston area; salesman for fine papers and specialties; man for pilot plant and research work on dissolving pulp; salesmen and demonstrators; beater engineers; machine tenders and back tenders.

LIST YOUR APPLICATION WITH US. IT WILL BE CONFIDENTIAL.

CHARLES P. RAYMOND SERVICE, Inc.
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WANTED

Slitter and Sheeter Operators Experienced on Cameron and Hamblet Machines.

Several Openings for steady, dependable Men, High Pay. Paid Hospital and Insurance, and paid holidays and Vacations. Plant located in Chicago Area. Give experience.

Box 53-159 care Paper Trade Journal. A-24

WANTED
FINISHING ROOM FOREMAN

For 70 ton book mill making Offset, Papeterie, Index, Mimeo, Cover, Text, etc., located in large city in Middle Atlantic States. Excellent opportunity for right man. All applications held in strictest confidence. Send complete personal history to Box 53-147, care Paper Trade Journal. A-24

MECHANICAL ENGINEERS

Well established Wisconsin firm requires several Engineering Draftsmen. Experienced in Pulp & Paper Mill or heavy machinery. Salary commensurate with ability.
Reply giving full particulars. All replies will be acknowledged. Write Box 53-165 care Paper Trade Journal. M-8

YOUNG CHEMIST—preferably with Pulp and Paper Training, and with at least two years experience to take over Control Laboratory of Midwestern Paper Mill. Staff of four. Please state education, experience and salary expected. Address Box 53-164 care Paper Trade Journal. M-1

HELP WANTED

WANTED

GENERAL SUPERINTENDENT qualified to take charge of field operations in industrial building department with General Contractor operating in the Southeastern States. Annual volume of business in excess of 25 million. Applicant must be a graduate engineer with good personality, able to conduct business with clients and have successful record as superintendent on heavy industrial construction and installation of equipment, with experience on Pulp and Paper Mills, Cement and Fertilizer Plants. Excellent salary.
Address Box 53-146, care Paper Trade Journal. M-8

PAPER TECHNOLOGIST
Wanted by
IBM

College graduate in the field of paper technology to assist in quality control. Should have experience in paper mill operation and the physical testing of paper and paper products.

Excellent working and living conditions, good salary, moving expenses paid, exceptional employee benefits. Write, giving full details, including education and experience to: Mr. W. L. Williams, Personnel Manager, International Business Machines, Endicott, N. Y. A-24

CHEMIST WANTED

CHEMIST for Research Department of a Company engaged in the manufacture of cellulose fibre board, coating compositions and adhesives, located in Western New York. Please submit resume of personal data, education and experience in the first letter.

Address Box 53-152, care Paper Trade Journal. A-24

PERSONNEL SERVICE ASSOCIATES
115 State Street, Springfield 3, Mass.
SPECIALIZED PLACEMENT SERVICE

for the Pulp, Paper and related Industries. Attractive positions for Administrative, Technical and Sales personnel always listed. Competent men always registered. Inquiries welcome. Confidential. A-24

SITUATIONS WANTED

SALES ENGINEER

with excellent sales record seeks more challenging future. P&P graduate with 11 years of varied lab, production and sales experience in mill and converting equipment fields. Eastern location preferred. Address Box 53-153—Paper Trade Journal. M-1

EXECUTIVE ASSISTANT

Do you need assistance on your production, equipment, or technical problems??? P&P graduate with over decade of experience, but not too old to lack drive or initiative to aid overworked executive NOW AVAILABLE. Willing to travel domestically. Address Box 53-154 care of the Paper Trade Journal. M-1

WANTED—A position as CHIEF ENGINEER. Over 18 years experience in steam power plants. Good references. Address Box 53-137 care Paper Trade Journal. A-24

GRADUATE ENGINEER — Presently employed as Plant Engineer, desires change for position with future. Has long experience in maintenance, design, operation and management. Address Box 53-133 care Paper Trade Journal. M-8

MANY YEARS EXPERIENCE in the manufacture of multi-wall and heavy duty bags. Desire contact preferably in supervisory capacity. Cost minded; can give good references. Address Box 53-143 care Paper Trade Journal. M-1

PLANT MANAGER—Paper and Board and their conversion. Highly successful record in organization; administration; development; labor relations; and high level production. Presently employed. Seeks challenging opportunity. Address Box 53-80 care Paper Trade Journal. A-24

SUPERINTENDENT or Assistant Superintendent—25 years in paper board industry on high grade folding boxboard in progressive mills. Capable of assuming full responsibility for production, quality, personnel problems. 44 years of age. Address Box 53-127 care Paper Trade Journal. A-24

SUPERINTENDENT—Twenty years experience in tissue, towel, napkin and facial. Excellent labor relations and references. Address Box 53-142 care Paper Trade Journal. M-1

MANAGER OR GENERAL SUPERINTENDENT with 25 years experience, desires to make contact with fine grade book mill that is having quality, production and high operation cost troubles. Salary is secondary importance until results are proven. Address Box 53-161 care Paper Trade Journal. M-8

SUPERINTENDENT—Twenty-five years of practical experience with strictly laboratory control manufacturing all kinds of light and heavy weight high grade specialty board on modern rapid running machines. Aggressive, capable man, excellent references. Address Box 53-157 care Paper Trade Journal. M-8

Pulp Mill Manager, new position desired: —30 years experience in specialty sulfite pulps, starting in research for 4 years, and for last 12 years as superintendent and manager of large northeastern pulp mill. Since 1948 Manager of Pulp Division, 180-325 tons specialty sulfite pulps and 200-250 tons unbleached soft and hardwood kraft pulps. Address Box 53-158 care Paper Trade Journal. M-8

FOR SALE

FOR SALE—IMMEDIATE DELIVERY

Four brand new, never used, heavy duty, high density, Model #672, Economy Upstroke balers equipped with 15 ft. deep chambers and good for 72 inch bales. Motors and controls for 440 volt, 3 phase, 60 cycle current.

Address Box 53-162 care Paper Trade Journal. M-1

FOR SALE

15 pcs.—New Dryer Gears with Machine Cut Teeth

1 pc. —New Pinion with Machine Cut Teeth

30 pcs.—New Bronze lined Dryer Bearings

5 pcs.—New Dryers 36" dia. x 84" Face

6 pcs.—New Steam Joints, Adapters, 1½" pipe, 70" long

14 pcs.—New Main Dryer Frames

4 pcs.—End Dryer Frames (new)

12 pcs.—New Top Felt Frames

4 pcs.—New End Felt Frames

12 pcs.—New Felt Rolls

40 pcs.—Felt Roll Brackets with Brass Liners

2 pcs.—Hand Guides complete with Brackets

1 pr. —Stretcher Frames complete with Cross Shafts

2 pcs.—Automatic Felt Guides complete with Cross Pipes

Apply, Box 53-166
c/o Paper Trade Journal

M-1

FOR SALE

New Dilts Beater Fillings ½ Price

135—Dilts Heat Treated Flybars for Dilts bandless type rolls, ¾" cutting edge 8" wide, standard keyed type section.

70—Dilts Heat Treated Flybars for Dilts banded type roll, ⅝" cutting edge, 6" wide, ⅜" back edge, 54" long standard Dilts banded roll.

66—Dilts Heat Treated Flybars ⅝" cutting edge, 6" wide, ⅜" back edge, 50" long for Dilts regular banded roll.

3—New Dilts Standard Bed Plates, elbow type 8" wide, 6" high, 55" long, circled for 62" dia. roll.

2—New Dilts Angle or Diagonal Type Bed Plates 10" wide, 6" high, circled for 62" diameter roll.

3—Sets New Wood Filling for 62" dia. 70 bar, Dilts rolls 54" face.

4—Sets New Wood Fillings for 35 bar, 72" dia. 54" face Dilts Bandless Rolls.

OSBORNE PAPER MILL EQUIPMENT CORP.

FULTON, N. Y. Tel. 2-4254
TF

FOR SALE

40" Clark & 42" Finley Sheeters.
42" & 50" Camachines No. 6.
48" Kidder model CH Slitter.
75" Moore & White 2-drum Rewinder.
100" Dillon Sheeter.
Back-Stands, any size, made to Order.

THOMAS W. HALL COMPANY, Inc.
120 West 42nd St., New York 36
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PAPER COATING MACHINERY MANUFACTURERS — Waxing, Oiling, Carbon Laboratory Coating and Treating and Flat Ream Measuring and Converting Machines. New improvement. THE MAYER MACHINE COMPANY, INC., 1313 Buffalo Road, Rochester, 11, N. Y. TF

FOR SALE

CAMERON SLITTERS
1—50" Model 28-3D Duplex.
1—42" Type 26-3A Duplex.
1—42" Type 26-2A.
1—42" and 1—60" Type 6.
1—52" Type 10—5A.
4—62" Type 40-1-AF.
1—62" Type 10-5.
2—72" Type 10-11, 1—Shear and 1—Score cut.

OTHER SLITTERS
1—90" Johnstone Mill Type Score Cut. 44" Maximum Rewind.
1—60" Meisel Series OP-1, Shear-cut.
1—60" Kidder, Model SH, Shear-cut 40" rewind.
1—48" Kidder Model CH Shear-cut.
1—48" Inman, Shear Cut, 48" Rewind.
1—60" Langston Type A, Shear-cut.
1—40" Beck, Shear-cut, Triplex Rewind.
1—56" Chambon, Shear-cut.
1—30" and 1—40" Model B Fales, Shear-cut.
1—40" Kidder S.L.

POWER PAPER CUTTERS
15—Seybold 44" "Sixty" Auto-Space, 56"-10Z, 84"-12ZH, 44"-6Z, 34"-3Y, 39" and 44" & 74"-20th Century, 56", 57" 64" and 74"-Daytons, 44", 48", and 55"-Holyokes, 74" Holyoke Mill Type.
4—Oswegos, 38", 44", 50" and 63".
3—Smith & Winchester Undercut, 63", 69" and 84".

PRINTING PRESSES
1—42" Kidder 6 color ANILINER, VS Drive. Roll to roll.
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1—24" Lembo 3-color Unit Type Rotogravure Press.
1—30" Aniline Tailprinter.
1—24" Schmutz 2-color Hand Fed Bag Press.

MISCELLANEOUS MACHINES
1—60" Chambers Varnishing Machine with Golden Gate Dryer and Dexter Pile Feeder.
1—Seybold 24" x 38" Die Press.
3—Sheridans, 18" x 33", 19" x 45" and 22" x 44" Die Presses.
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Nopco Chemical Co.
Reichhold Chemicals, Inc.
Wyandotte Chemicals Corp., Michigan Alkali Div.

COATINGS, CORROSION PROOF
Insul-Mastic Corp. of America

COMPLETE FOURDRINIER ROLL GRINDING
Manchester Machine Co.

COMPRESSORS
Nash Engineering Co.
Roots-Connersville Blower Corp.

CONDENSATE FILTERS
Hungerford & Terry, Inc.

CONDENSATION CONTROL
Insul-Mastic Corp. of America

CONDENSERS
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Elliott Company, Inc.
Midwest Fulton Mch. Co.
Westinghouse Elec. Corp.

CONTRACTORS
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CONSISTENCY REGULATORS
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DeZurik Shower Company
Pandia, Inc.

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Ferguson, H. K., Company
Alvin H. Johnson & Co., Inc.
Main, Inc., Chas. T.
O'Donoghue, Roderick
Rust Engrg. Co.
J. E. Sirrine & Co.
John Waldron Corp.

CONTINUOUS DIGESTER
Pandia, Inc.

CONTROLLERS
Black Clawson Company

CONTROLS
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Poirier Control Co.
Shartle Bros. Mch. Co.
Westinghouse Electric Corp.

CONVERTING MACHINERY
The Bagley & Sewall Company
Dilts Machine Works
Egan, Frank W., & Co.
Paper Converting Machine Co.
Waldron, John, Corp.

CONVEYORS
Black Clawson Company
Downingtown Mfg. Co.
Jeffrey Mfg. Co.
Link Belt Co.
Murray, D. J., Mfg. Co.
Ross Engineering Corp., J. O.
Shartle Brothers Mch. Co.

CORES
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Mead Board Sales, Inc.
Sonoco Products Co.

CORROSION RESISTANT COATINGS
Amercoat Corporation
Insul-Mastic Corp. of America

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Hercules Powder Co., Inc.
Railway Supply & Mfg. Co.

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Improved Machinery Inc.
Manchester Machine Co.

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Black Clawson Company
Downingtown Mfg. Co.
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Hermann Mfg. Co.
E. D. Jones & Sons Co.
Dodge Mfg. Corp.
Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works
Waldron Corp., John

CRANES
Ederer Engrg. Co.
Whiting Corp.

CURL TESTERS
Testing Machines, Inc.
Thwing-Albert Instrument Co.

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Beloit Iron Works
Black Clawson Company
Clark-Aiken Co.
Dilts Machine Works
Downingtown Mfg. Co.
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Moore & White Co.
Perkins & Son, Inc., B. F.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
The Smith & Winchester Mfg. Co.
Taylor, Stiles & Co.

CYLINDER MOULDS
Black-Clawson Co.
Downingtown Mfg. Co.
Hayden Wire Works Inc.
Improved Paper Machinery Corp.
Manchester Machine Co.
Rice Barton Corporation

CYLINDERS
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M. W. Jenkins Sons, Inc.

CYLINDER WIRES
Hayden Wire Works Inc.
Wisconsin Wire Works

DAMPENERS
Perkins & Son, Inc., B. F.
Valley Iron Works Co.

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Elliott Company, Inc.

DECKLE WEBBING
Williams-Gray Co.

DEFIBRATORS
American Defibrator Co.

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Hercules Powder Co., Inc.

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Denver Equipment Co.
Dilts Machine Works
General Dyestuff Corp.
Kinsley Chemical Co.
Rice Barton Research Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

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General Dyestuff Corp.
Jackson & Church Co.
Nopco Chemical Co.

DE-MINERALIZING EQUIPMENT
Hungerford & Terry, Inc.

DEMULSIFIERS
Wyandotte Chemicals Corp., Michigan Alkali Div.

DENSOMETERS
Testing Machines, Inc.
W. & L. E. Gurley

DESIGN CONSTRUCTION
Ebasco Services

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Diamond Alkali Co.
General Dyestuff Corp.
Monsanto Chemical Company
Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

DEWAXING CHEMICALS
American Cyanamid Company, Industrial Chemicals Division
General Dyestuff Corp.
Nopco Chemical Co.

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Pusey & Jones Corp.

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General Dyestuff Corp.
Monsanto Chemical Company
National Aluminate Corp.
Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

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Black Clawson Company
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Lobdell United Co.
Lodding Engineering Corp.
The Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

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Shartle Brothers Machine Co.
Valley Iron Works Co.

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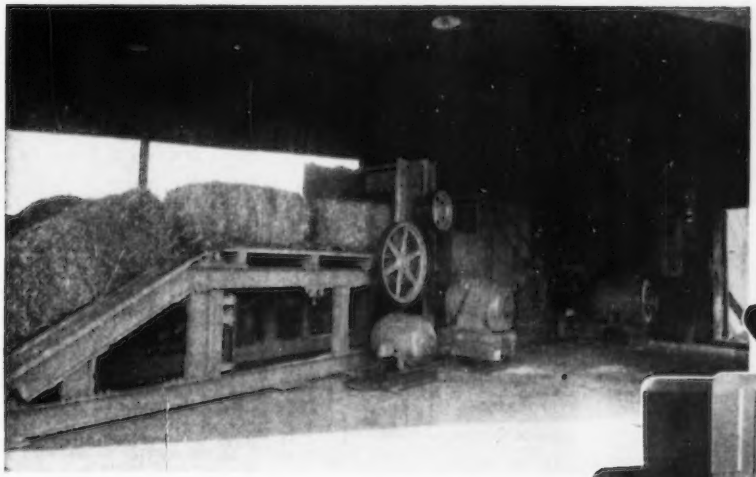
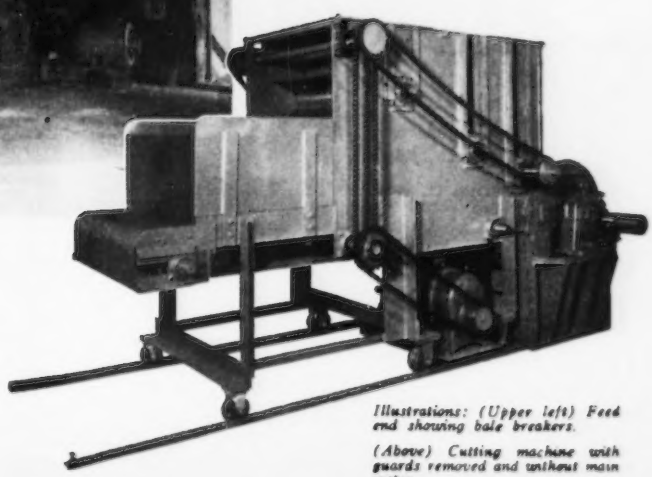
A NEW COMBINATION BALE OPENER AND STRAW CUTTER



This new machine is part of the development program sponsored by the U. S. Government and by the paper manufacturers to improve the processing of straw for incorporation in strawboard and other papers.



- It opens the bales.
- Cuts the straw to short lengths.
- Shortens the time in the digesters.
- Improves the product.
- Permits the use of straw in papers where never possible before.
- Cuts up to 1000 pounds of straw per minute.

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Illustrations: (Upper left) Feed end showing bale breakers.

(Above) Cutting machine with guards removed and without main motor.

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Geigy Co., The

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Vanderbilt Co., R. T.
Wyandotte Chemicals Corp., Michigan Alkali Div.

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Palmer Filter Equipt. Co.

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Hungerford & Terry, Inc.
Improved Machinery Inc.
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Moore & White Co.
J. O. Ross Engrg. Corp.
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The Sandy Hill Iron & Brass Works

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Elwell Parker Elec. Co.

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Manchester Machine Co.
The Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

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The Goodyear Tire & Rubber Company

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GEAR REDUCER DRIVES
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Moore & White Co.
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Rice Barton Corporation
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Shartle Brothers Machine Co.
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Valley Iron Works Co.
Westinghouse Electric Corp.

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Lobdell United Co.
Norton Company
Samuel C. Rogers and Company
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Gilbert & Nash Co.
The Moore & White Co.
Mount Hope Machinery Co.
Rice Barton Corporation
Waldron, John, Corp.

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Paper Converting Machine Co.
The Sandy Hill Iron & Brass Works
Waldron, John, Corp.

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Ross Engineering Corp., J. O.
Valley Iron Works Co.
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The Goodyear Tire & Rubber Company

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Nopco Chemical Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

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B. F. Goodrich Chemical Co.

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INDUSTRIAL TIRES
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Egan, Frank W., & Co.
Hermann Mfg. Co.
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Testworth Laboratories
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Valley Iron Works Co.
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Paper Converting Machine Co.
Rice Barton Corporation
Waldron, John, Corp.

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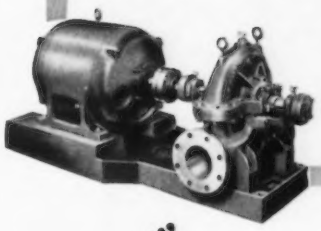

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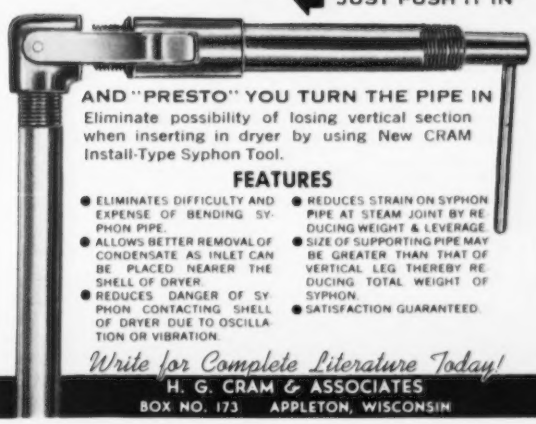

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Manchester Machine Co.
Rice Barton Corporation
Westinghouse Electric Corp.

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Beloit Iron Works
Black-Clawson Company
Downingtown Mfg. Co.
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Lukenweld
Manchester Machine Co.
Moore & White Co.
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Langston Co., Samuel M.
Paper Converting Machine Co.

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Nopco Chemical Co.

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Black-Clawson Company
Dilts Machine Works
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
Murray, D. J., Mfg. Co.
Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John

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Walworth Company

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Walworth Co.

PIPING, HIGH PRESSURE
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General Dyestuff Corp.
Monsanto Chemical Company
National Aluminate Corp.
Nopco Chemical Co.

PLASTICIZERS
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Aktivin Division, Heyden Chemical Corp.
B. F. Goodrich Chemical Co.
Jackson & Church Co.
Naugatuck Chemical Division of U. S. Rubber Co.
Nopco Chemical Co.

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Gibbs-Brower Company, Inc.
Perkins & Son, Inc., B. F.

PLATES
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Babcock & Wilcox Co.
Lukenweld Division
Lukens Steel Company
J. O. Ross Engrg. Corp.
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E. D. Jones & Sons Co.
Shartle Brothers Machine Co.

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Manchester Machine Co.
Rice Barton Corporation

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Thwing-Albert Instrument Co.

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E. I. du Pont de Nemours & Co.
General Dyestuff Corp.

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Black-Clawson Co.
Downingtown Mfg. Co.
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Manchester Machine Co.
Rice Barton Corporation

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Cowles Company
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Pulp and Paper Trading Co.
Pulp Sales Corp.
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PULPSTONES
Norton Company

PULP TESTERS
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Williams Apparatus Co., Inc.

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F. L. Smidth & Co.

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Black Clawson Company
Buffalo Pumps, Inc.
Byron Jackson Co.
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Roots Connersville Blower Corp.
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Ross Paper Machy. Corp.
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Shartle Brothers Machine Co.
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Chas. Mundt & Sons

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Black Clawson Company
Dilts Machine Works (Kohler Systems)
Egan, Frank W., & Co.
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Manchester Machine Co.
Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
The Smith & Winchester Mfg. Co.
Waldron, John, Corp.

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Bauer Brothers Co.
Dilts Machine Works
Downingtown Mfg. Co.
Gibbs-Brower Company, Inc.
Hermann Mfg. Co.
Jackson & Church Co.
E. D. Jones & Sons Co.
Morden Machines Co.
Murray, D. J., Mfg. Co.
Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Sutherland Refiner Corp.
Valley Iron Works

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Improved Paper Machinery Corp.
Johnson Corp.
Shartle Brothers Machine Co.
Taylor Instrument Companies
Westinghouse Electric Corp.
Poirier Control Company

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B. F. Goodrich Chemical Co.
The Goodyear Tire & Rubber Company
Hercules Powder Co.
Monsanto Chemical Company
Naugatuck Chemical Division of U. S. Rubber Co.
Nopco Chemical Co.
Reichhold Chemicals, Inc.

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The Bagley & Sewall Company
Beloit Iron Works
Black Clawson Company
Dilts Machine Works
Downingtown Mfg. Co.
Frank W. Egan & Co.
Farrel-Birmingham Co.
Gibbs-Brower Company, Inc.
B. F. Goodrich Co.
Holyoke Machine Co.
Lindsay Wire Weaving Co.
Lobdell United Co.
Manchester Machine Co.
The Moore & White Co.
D. J. Murray Mfg. Co.
Perkins, B. F., & Sons Co.
Pusey & Jones Corp.
J. J. Ross Company
Rice Barton Corporation
Ross Paper Machy. Co.
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Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
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ROLL COVERS
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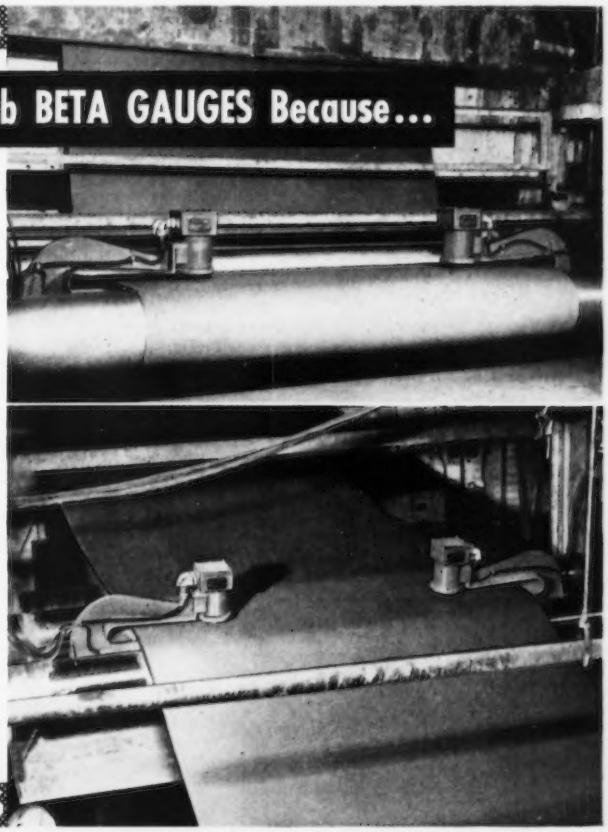
BIRD & SONS Likes Tracerlab BETA GAUGES Because...



. . . this four gauge installation gives them for the first time instantaneous control over several floor covering production operations. The upper picture shows asphalt impregnated base stock being gauged on each edge, before application of a sealing coat of paint. The lower picture shows the gauge measuring the same base stock, plus sealing coat. By feeding results from the two right-hand and two left-hand gauges into separate pens of a two-pen recorder (mounted adjacent to the paint controls), a simple, highly accurate control of coating weight is established.

Prior to the use of Tracerlab gauges completed rolls were weighed after drying. By this time several rolls had been run. Even worse, while roll weight might be correct, sections within the roll were often off weight. Too, no check was available on coating unevenness due to a "cocked" doctor blade. Off-goods from these causes have now been completely eliminated and Bird floor coverings of better quality and wearing ability have been assured.

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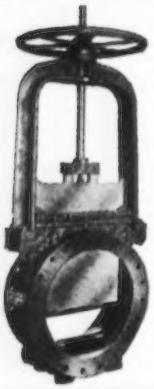

RECORD PAPER & PULP STOCK VALVES "BONNETLESS" SELF CLEARING - - - "RESIDUE POCKETLESS TYPE"

METALS — I. B. B. M., all iron, bronze or stainless steels, body parts plain or rubber lined.

The photo of 24" Fig. 241 I. B. B. M. valve while illustrating the gate bottom wedge system for forced gate seating and "GUILLOTINE" edge for shearing fibre at seat also shows the packing box and yoke as separate units. Both adjustable.

- The "FAST THREADED" screw stem and ball bearing speeds valve operation.
- The packing box is extra deep, is adjustable and provided with specialized lubricated packings and special type gland and compression bolts.
- The yoke mountings are such that yokes for various methods of gate operation are interchangeable.
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Weber, Herman G.

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Testing Machines, Inc.

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Morey Paper Mill Supply Co.
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SCREENS (Perforated)
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The Hubinger Co.
Monsanto Chemical Company
National Aluminate Corp.
Nopco Chemical Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

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Thwing-Albert Instrument Co.
Williams Apparatus Co., Inc.

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E. I. du Pont de Nemours & Co.
General Dyestuff Corp.
Magnuson Products Corp.
Monsanto Chemical Co.
National Aluminate Corp.
Vanderbilt Co., R. T.
Wyandotte Chemicals Corp., Michigan Alakli Div.

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Black-Clawson Company
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Carthage Machine Co.
Clark-Aiken Co.
Dietz Machine Works
Dilts Machine Works
Downingtown Mfg. Co.
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
Thomas W. Hall Co., Inc.
Hamblet Machine Co.
Hudson-Sharp Mch. Co.
Improved Machinery Inc.
Langston Co., Samuel M.
Moore & White Co.
D. J. Murray Mfg. Co.
Paper Converting Machine Co.
Rice Barton Corporation
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

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Chicago Bridge & Iron Co.

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Testing Machines, Inc.
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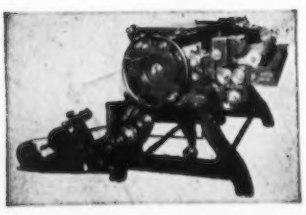

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Carnegie Illinois Steel Co.
Lukens Steel Company
D. J. Murray Mfg. Co.
The Sandy Hill Iron & Brass Works
U. S. Steel Corp.

STEEL, CLAD
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Lukens Steel Company

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Nopco Chemical Co.

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D. J. Murray Mfg. Co.
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Shartle Brothers Machine Co.
Valley Iron Works Co.

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TUBING MACHINES
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TUBING, MECHANICAL
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Rice Barton Corporation
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DeZurik Shower Co.
Dilts Machine Works
Downingtown Mfg. Co.
Grinnell Company
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Magnus Metal Corp.
D. J. Murray Mfg. Co.
William Powell Co.
Record Fdy. & Mch. Co.
Rice Barton Research Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.
Walworth Company

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Insul-Mastic Corp. of America

VATS
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Black-Clawson Co.
Beloit Iron Works
Downingtown Mfg. Co.
Rice Barton Corporation

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Downingtown Mfg. Co.
Gibbs-Brower Company, Inc.
Improved Paper Machinery Corp.
Jackson & Church Co.
E. D. Jones & Sons Co.
Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

WASTE CONVEYOR SCREENS
Mundt, Chas., & Sons

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Link Belt Co.

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Hungerford & Terry, Inc.
National Aluminate Corp.
Palmer Filter Equipt. Co.
The Sandy Hill Iron & Brass Works

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Naugatuck Chemical Division of U. S. Rubber Co.

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Holyoke Machine Co.
Improved Paper Machinery Corp.

WATER PENETRATION TESTER
Testing Machines, Inc.
Thwing-Albert Instrument Co.
Williams Apparatus Co., Inc.

WATER SOFTENERS
Hungerford & Terry, Inc.
Wynadotte Chemicals Corp. Michigan Alkali Div.

WATER TREATING EQUIPMENT
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Thwing-Albert Instrument Co.

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Black-Clawson Company
Dilts Machine Works
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
The Mayer Machine Co.
Paper Converting Machine Co.
Potdevin Machine Co.
Shartle Brothers Machine Co.
Waldron Corp., John
Weber, Herman G.

WEB TENSION CONTROL
Dilts Machine Works (Kohler Systems)
Egan, Frank W., & Co.
Waldron, John, Corp.

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Walworth Company
Westinghouse Electric Corp.

WELDING FITTINGS
Pittsburgh Piping & Equipt. Co.

WET MACHINES
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Black-Clawson Company
Carthage Machine Co.
Downingtown Mfg. Co.
Improved Paper Machinery Corp.
Moore & White Co.
Pusey & Jones Corp.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

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Reichhold Chemicals, Inc.

WETTING AGENTS
American Cyanamid Company Industrial Chemicals Division
Diamond Alkali Co.
General Dyestuff Corp.
Monsanto Chemical Company
Nopco Chemical Co.
Wyandotte Chemicals Corp. Michigan Alkali Div.

WHITE WATER TREATING EQUIPT.
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Bulkley, Dunton Processes, Inc.
Hungerford & Terry, Inc.
The Sandy Hill Iron & Brass Works

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The Bagley & Sewall Company
Beloit Iron Works
Black-Clawson Company
Cameron Machine Co.
Clark-Aiken Co.
Dietz Machine Works
Dilts Machine Works (Kohler Systems)
Downingtown Mfg. Co.
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Hudson-Sharp Machine Co.
Langston Co., Samuel M.
Manchester Machine Co.
Moore & White Co.
Paper Converting Machine Co.
Potdevin Machine Co.
Pusey & Jones Corp.
Rice Barton Corporation
Ross Paper Machinery Co.
The Sandy Hill Iron & Brass Works
Smith & Winchester Mfg. Co.
Waldron, John, Corp.

WINDING ROLL CHANGERS
Dilts Machine Works (Kohler Systems)
Egan, Frank W. & Co.
Waldron, John, Corp.

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Rolls up profits—rolls back costs—with table and press rolls on TIMKEN® bearings

THIS new paper making machine, built by The Moore & White Company for the Hopper Paper Company, uses 90 Timken® bearings on the Fourdrinier table rolls and all press rolls. Bert Hopper, president of the company, reported: "It was the feeling of everyone in the mill that the Timken roller bearings were largely responsible for the following remarkable wire life. They went into production on May 12th of last year and ran the first wire 114 days, six days a week. The second wire ran until February 27th, or 124 days. They use a 70 mesh, 70 foot long Bronze Longcrimp wire 136" wide."

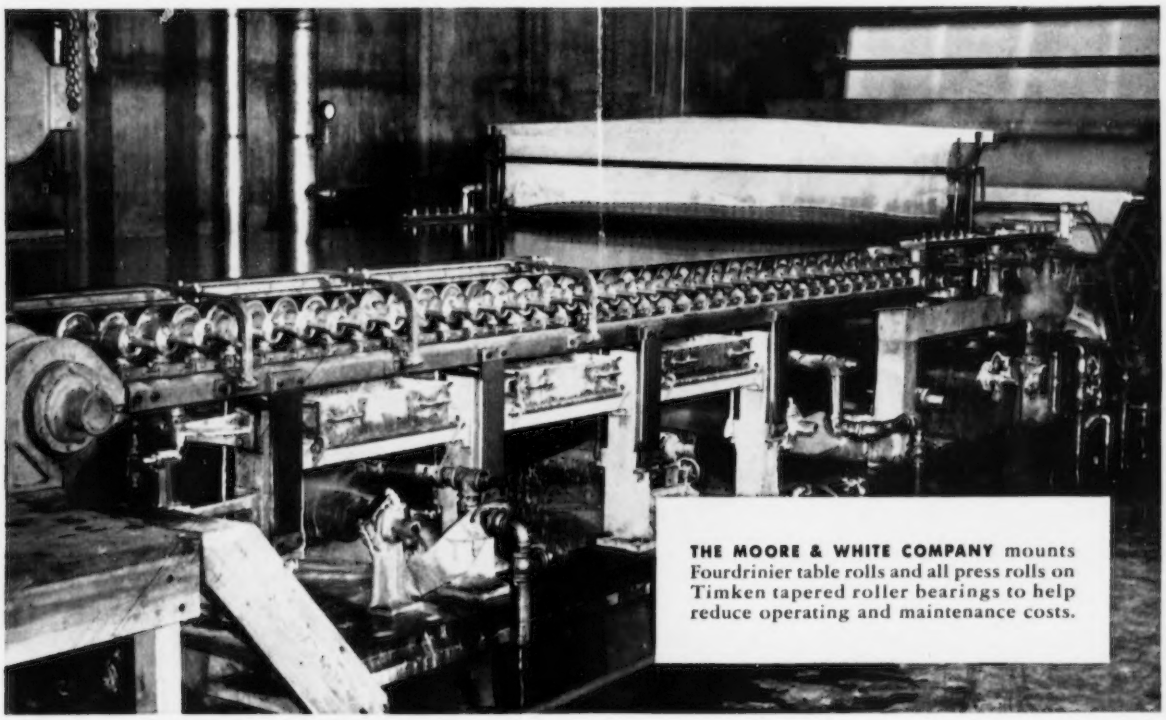
Timken bearings cut maintenance and lubrication costs, too. That's because they make closures more effective—keep dirt and moisture out, keep lubricant in. Paper spoilage from oil or grease is prevented.

Due to line contact between rollers and races, Timken bearings have extra load-carrying capacity. Their tapered construction enables them to take any combination of radial and thrust loads. And Timken bearings are made of the finest steel ever developed for tapered roller bearings—Timken fine alloy steel.

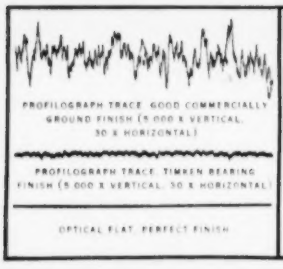
No other bearing can give you *all* the advantages of Timken bearings. They're backed by over 50 years of bearing research and development. Whether you build or buy paper making machinery, it will pay you to specify Timken bearings. Always look for the trade-mark "Timken" stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN BEARING EQUIPPED

This symbol on a product means its bearings are the best.



THE MOORE & WHITE COMPANY mounts Fourdrinier table rolls and all press rolls on Timken tapered roller bearings to help reduce operating and maintenance costs.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PROFILOGRAPH TRACE, TIMKEN BEARING FINISH (5,000 X VERTICAL, 50 X HORIZONTAL)
OPTICAL FLAT, PERFECT FINISH

SMOOTH TO MILLIONTHS OF AN INCH

Surface finish of high quality Timken bearing rollers and races is so smooth that it takes a profilograph to measure its smoothness. This instrument measures surface variations to a millionth of an inch, as shown at the left.

TIMKEN

TAPERED ROLLER BEARINGS

NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION